2018

Analyzing Physical Education Teacher Behavior Using Systematic Observation

Seth T. Eckler
University of Kentucky, seth.eckler@gmail.com
Digital Object Identifier: https://doi.org/10.13023/etd.2018.272

STUDENT AGREEMENT:

I represent that my thesis or dissertation and abstract are my original work. Proper attribution has been given to all outside sources. I understand that I am solely responsible for obtaining any needed copyright permissions. I have obtained needed written permission statement(s) from the owner(s) of each third-party copyrighted matter to be included in my work, allowing electronic distribution (if such use is not permitted by the fair use doctrine) which will be submitted to UKnowledge as Additional File.

I hereby grant to The University of Kentucky and its agents the irrevocable, non-exclusive, and royalty-free license to archive and make accessible my work in whole or in part in all forms of media, now or hereafter known. I agree that the document mentioned above may be made available immediately for worldwide access unless an embargo applies.

I retain all other ownership rights to the copyright of my work. I also retain the right to use in future works (such as articles or books) all or part of my work. I understand that I am free to register the copyright to my work.

REVIEW, APPROVAL AND ACCEPTANCE

The document mentioned above has been reviewed and accepted by the student's advisor, on behalf of the advisory committee, and by the Director of Graduate Studies (DGS), on behalf of the program; we verify that this is the final, approved version of the student's thesis including all changes required by the advisory committee. The undersigned agree to abide by the statements above.

Seth T. Eckler, Student

Dr. Aaron Beighle, Major Professor

Dr. Margaret Bausch, Director of Graduate Studies

Analyzing Physical Education Teacher Behavior Using Systematic Observation

---

DISSERTATION

A dissertation submitted in partial fulfillment
of the requirements for the degree of Doctor of Philosophy in the
College of Education
at the University of Kentucky

By
Seth T. Eckler

Lexington, Kentucky

Director: Dr. Aaron Beighle, Professor of Kinesiology and Health Promotion

Lexington, Kentucky

2018

ABSTRACT OF DISSERTATION

ANALYZING PHYSICAL EDUCATION TEACHER BEHAVIOR USING SYSTEMATIC OBSERVATION

Introduction: Experts in the field have advocated that quality physical education (QPE) is the centerpiece of a comprehensive school physical education program (CSPAP). Evidence-based programs and instructional models have shown great promise in increasing the physical activity (PA) of today's youth. However, little is known about the specific impact of teaching behaviors (TB) used within these programs and their impact on student outcomes. Therefore, the aim of this study was to use a systematic observation method that is primarily focused on analyzing TBs that are displayed in class, identify TBs that may contribute to positive student activity outcomes, and make recommendations to current and future physical educators on behaviors they should and should not include in their teaching. ***Methods:*** Data for student activity and the Observational Record for Recording Physical Educator Teacher Behavior (ORRPETB) observation method were obtained from 22 video recorded elementary PE lessons. ***Results:*** The majority of the lesson *climate* was spent in activity (64.5%), followed by instruction (20.1%), management (10.8%), and waiting (4.6%). *Interactions* between the teacher and student revealed that teachers spent on average 59% of their lessons interacting with the whole class. Teachers interacted with individuals 32% (52% male, 48% female) and small groups, on average, 8% of the time. The primary outcome variable *teacher behaviors* found that, on average, teachers spent 27% of lesson time lecturing/orienting and 24% of lesson time monitoring their students. The next most common condensed *teacher behavior* was managing (13%), followed by fielding and responding to questions (10%), skill feedback – corrective (9%), behavioral feedback (7%), modeling (5%), undesirable behavior (3%), and skill feedback (2%) ***Discussion:*** The descriptive information in the study uncovers some important characteristics of PE impact teacher behaviors. Identifying "monitoring" as an impact teacher behavior that contributes significantly to the activity levels of students provides useful variable data. Despite this teaching behavior variable's potential to increase student PA and moderate to vigorous PA (MVPA), PE specialists should attempt to balance the amount of monitoring that occurs in their classrooms with other desirable impact behaviors (i.e., providing skill feedback – non-corrective) while limiting impact behaviors that negatively impact PA (i.e., managing, skill-feedback corrective, etc.).

KEYWORDS: Physical Activity, Physical Education, Teacher Behaviors, Systematic

Observation, ORRPETB.

__Seth T. Eckler_____
Student's Signature

__07/09/2018_____
Date

ANALYZING PHYSICAL EDUCATION TEACHING BEHAVIOR USING SYSTEMATIC OBSERVATION

By

Seth T. Eckler

Aaron Beighle
Director of Dissertation

Margaret Bausch
Director of Graduate Studies

07/09/2018
Date

DEDICATION

For my family – Shelly, Tatum and Jack

ACKNOWLEDGMENTS

The following dissertation could not have been possible without the guidance, insight, and support of several people.

First and foremost, I would like to thank Dr. Aaron Beighle and Dr. Heather Erwin for their constant guidance and support during this research project. Their support was invaluable, aiding me in the research design, data collection, and the final composition of the document. They provided unvarying encouragement, but also knew when to push me to ensure I completed the best possible research project. I am grateful for their mentorship and friendship.

Ben Montemayor for being a good friend and confidant throughout this process. For providing numerous hours of observation for very little in return. Your work as an interobserver to establish reliability with the measurement tool was well worth the Friday afternoon lunches.

I would also like to thank Dr. Glenn Weaver, Dr. Elizabeth Whitney and Dr. Jody Clasey who generously provided their time and energy serving on this dissertation committee. I appreciate their commitment to the project as well as their guidance throughout.

I am grateful to the teacher and student participants of the study (who remain anonymous for confidentiality purposes) for their time and energy. Their willingness to participate made this project possible.

I would like to thank my parents Tom and Vickie Eckler. I am grateful for the encouragement and support they have provided throughout my academic and professional

career. They have always believed I could achieve whatever I intended. They have been interested in my work and possibly as stressed as me during the past several months. I am thankful for their continued love. I will never be able to repay the gifts they have given but hope that my impact on others will be a reflection of them. The love they give me makes me want to do more.

Thank you to my sons Tatum and Justus, who continually lift my spirits, remind me of the joy found in all situations, and make a smile come across my face daily. Tatum, you are such a special kid, the kindness and love you show towards your brother, mother, myself and others is inspiring. Jack, the light you bring to our lives through your laughter and energy rejuvenates me daily.

Finally, I would like to thank my wife Shelly. From the very beginning her encouragement, patience and love has been something I have leaned on. You have sacrificed our most important commodity, time, in an effort to support my dreams. Thank you and I love you.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Analyzing Physical Education Teaching Behavior Using Systematic Observation

Introduction

The interest the public health sector has shown in physical education (PE) has grown exponentially over the past three decades (Sallis, et al., 2012; Sallis & McKenzie, 1991). This in part is due to the portion of America's youth that are considered obese. One recent analysis indicated that 17% of America's youth population aged 2-19 is obese (Ogden et al., 2016). Obesity rates remain high despite evidence suggesting that obesity can lead to high blood pressure in children as well as other chronic diseases that track into adulthood (Singh, Mulder, Twisk, van Mechelen, & Chinapaw, 2008). To decrease the amount of youth that are plagued by the symptoms of obesity, a national call for increased physical activity (PA) has been issued (U.S. Department of Health and Human Services: Physical Activity Guidelines Advisory Committee, 2008). An emphasis has been placed on increasing PA due to the numerous biological (Janssen & Leblanc, 2010) and psychosocial (Biddle & Asare, 2011) benefits. In 2018 (Centers for Disease Control and Prevention, 2017), federal government recommendations for PA stress that children and adolescents perform 60 minutes or more of daily PA and that bouts of PA should consist of various intensity level (moderate to vigorous [MVPA]) aerobic, muscle strengthening, and bone strengthening activities). These recommendations also encourage youth to participate in at least three bouts of vigorous exercise and place an emphasis on activities that are age appropriate, enjoyable and offer variety. In an attempt to help youth reach these recommendations the Centers for Disease Control and Prevention (CDC) along with SHAPE America have endorsed healthy guidelines that promote healthy

eating and PA. Among these comprehensive guidelines, the agencies call for schools to implement Comprehensive School Physical Activity Programs (CSPAP) that have quality physical education (QPE) as their cornerstone (Centers for Disease Control and Prevention, 2013).

Comprehensive School Physical Activity Program

A Comprehensive School Physical Activity Program (CSPAP) is a systematic approach by which schools maximize students' opportunities to be active, meet the nationally-recommended 60 minutes of PA each day, and develop the knowledge, skills, and confidence to be physical active for a lifetime. The five components of a CSPAP are quality physical education (QPE), physical activity during school, physical activity before and after school, staff involvement and family and community engagement. One of the goals of a CSPAP is to provide a variety of PA opportunities throughout the school day, with a QPE program as the foundation (Centers for Disease Control and Prevention, 2013).

QPE, as the cornerstone of a CSPAP, is multifaceted and includes: meeting the needs of all students, keeping students active for most of PE class time, teaches self-management, emphasizes knowledge and skills for a lifetime of PA, and is an enjoyable experience for all students (SHAPE America, 2015). PE is commonly referenced as a significant contributor to the daily PA of youth (Corbin & Pangrazi, 1998; Pangrazi & Beighle, 2015). Along with the SHAPE America objectives, other recommendations have been made by health authorities to ensure QPE. One of these recommendations is that QPE should engage students in beneficial PA for at least 50% of lesson time (US Department of Health and Human Services, 2000). Yet, studies show that elementary

students engage, on average, in only 36.2% of MVPA during PE (Fairclough & Stratton, 2006; National Institute for Child Health and Human Development [NICHD], 2003).

Despite the objectives of QPE being clearly defined, many PE specialists struggle to identify whether they are providing their students with QPE (LaFee, 2008) and how to best identify aspects of a QPE lesson and teacher. Efforts to evaluate the performance of physical educators and their ability to meet these objectives has gradually become a focus of PE research (McKenzie & Lounsberry, 2014). Some of the difficulties that accompany evaluating the performance of physical educators is the lack of a consistent definition for teacher effectiveness. While the contribution PE makes to the PA levels of youth has been examined (Morgan, Beighle, & Pangrazi, 2007) research examining the impact the teacher may have on PA levels during PE is lacking. That is, very little is known about teacher effectiveness in PE, when effectiveness is in part measured by student movement.

Teacher Effectiveness in PE

Some have identified student learning through content knowledge and student achievement through assessment as primary outcome measures of teacher effectiveness (Rink, 2013; Ward, 2013). Still others identify student content knowledge and achievement as important, yet they recommend teacher effectiveness be measured by how often teachers provide students with health-enhancing PA (McKenzie & Lounsberry, 2014). Possible one consensus can be reached when exploring the empirically based best practices for effective teaching and learning in physical education and that is effective physical educators should place a priority on student movement. Therefore, at a relatively basic level, effective physical educators have high student engagement in PA.

To expand on the difficulties of measuring teacher effectiveness, the unique

teaching intricacies that are involved in PE make it difficult to establish best practices that are consistent throughout all PE environments, specifically, best practices that impact student PA. Currently, many research efforts in PE focus on identifying evidence-based curriculum, teaching styles and instructional models that help physical educators be "effective" (Metzler, 2014). Research analyzing model-based instruction has shown promise by identifying instructional models that promote positive student outcomes, for instance skill acquisition and motor skill development (Gurvitch & Metzler, 2013). However, research in this context has focused little on the impact individual models can have on PA and more on how to train teachers to use those models and how maximize the potential of those models in respect to their design (Metzler, 2014).

In addition to instructional models, research focused on specific teaching styles and their potential impact on student outcomes are substantial. One meta-analysis found that the use of practice and reciprocal styles of teaching significantly impacts motor-skill acquisition (Chatoupis & Vagenas, 2018). Despite the positive impact these findings have on the field, determining specific teaching styles may influence the amount of PA students acquire during PE lessons is still unknown. According to the classic text *Teaching in Physical Education* (Mosston, 1966) student outcomes are tied not only to the pre-impact decisions made by the teacher (i.e., instructional models, teaching styles), but the impact behaviors the teacher displays during the lesson. Thus, examining PE teacher effectiveness by focusing on teaching impact behaviors, that is, behaviors PE specialist display during PE class may contribute to positive student outcomes is prudent.

In 1993, LaMaster and Lacy found that teachers spent, on average 34% of their lesson time in silence, 28% of their lesson time in instruction, and 26% of their lesson

time in management (measured using the Arizona State University Observation Instrument [ASUOI]). Another study found that teachers spent more time giving information and directions, questioning, and providing feedback than all other observed behaviors (using Cheffers' Adaptation to Flander's Analysis System [CAFIAS]) (Yu & Kim, 2010). Moreover, this study also presented empirical data that these behaviors led to less than ideal student outcomes due to students becoming more passive learners. More recently Weaver et al. (2016) analyzed teacher behaviors and their influence on student MVPA (measured by accelerometry) using the SOFIT+ observation system. No individual teacher behaviors were identified that significantly impacted student MVPA, however, the study did find that teacher behaviors, such as demonstrating and instructing (50.1%) and engaging in activity with students (11.4%) were common practice.

For the purposes of this discussion, teacher effectiveness, that is, effective instruction during physical education, will be measured as the amount of student engagement in PA during PE. With this context, identifying teaching behaviors that may influence student PA should be further examined. A review of the literature examining teaching behaviors in physical education finds limited research in this area. One factor that may influence the amount of research that has examined PE "teacher behavior" is the lack of a congruent definition of what constitutes a teaching behavior. Previous research defined teacher behavior broadly as any action or characteristic that has an impact on the outcomes of classroom teaching (Flanders & Simon, 1969). More recently, researchers have attempted to identify teaching behavior characteristics that fall within several categories (i.e. – teacher as a person, classroom management and organization, organizing and orienting for instruction, monitoring student progress and potential and

professionalism) (Stronge, 2018). Further, Mosston and Ashworth (2002) describe three primary teaching behaviors; pre-impact, impact, and post-impact that contribute to the teacher-learner dynamic.

Figure 1: Definition of teaching behavior terms

Term:	Definition
Teaching behavior	Any action or characteristic that has an impact on the outcomes of classroom teaching (Flanders & Simon, 1969)
Pre-impact teacher behavior	Intentional decision made prior to lesson execution (i.e., curriculum, instructional model) (Mosston & Ashworth, 2002).
Impact teacher behavior	Intentional and adjustment decisions made during lesson that adhere to preimpact decisions (Mosston & Ashworth, 2002).
Post-Impact teacher behavior	Decisions made that deal with assessing student performance of task and providing appropriate performance feedback (Mosston & Ashworth, 2002).

Systematic Observation in PE

Research attempting to identify during-instruction teacher behaviors or impact behaviors that are present and may contribute to effective PE have used systematic observation as their analysis method. To date, when attempting to analyze teacher behaviors systematic observation methods, such as Academic Learning Time in PE (ALT-PE) (Sidentop, Birdwell, & Meltzer, 1979), Cheffers' Adaptation to Flander's Interaction Analysis System (CAFIAS) (Cheffers, 1972) and the System for Observing Fitness Instruction Time (SOFIT) (McKenzie, Sallis, & Nader, 1992), as well as the new version of the measurement tool SOFIT+ (Weaver, et al., 2016) have been validated and used in multiple studies. These methods, along with some others have found impact behaviors such as monitoring or silently observing, lecturing/orienting or providing

instruction, management, and feedback as behaviors that are displayed within PE lessons in various amounts. Nevertheless, attempts to establish concrete relationships between impact behaviors and desired student outcomes are relatively unexplored. One systematic observation method that has been used on a limited basis to observe impact teacher behaviors is the Observational Recording Record of Physical Educator Teacher Behavior (ORRPETB) (Stewart, 1979). This observational method is a multidimensional method that can be used to record the instructional climates, interactions, teacher behaviors, or any combination thereof (see Figure 2) (Stewart, 1979). This method addresses teacher effectiveness by assessing teacher behavior directly and by assessing the performance of the students indirectly. To date, in United States, this method has been used as the primary measurement method in only one peer reviewed journal article where in ORRPETB was used to monitor the type of student/teacher verbal interactions (Hannon & Ratliffe, 2007). It has also been utilized in two dissertations that analyzed the incidents of each outcome variable (i.e., *climates, interactions,* and *teacher behaviors*) displayed in specific motor context (Lorson, 2003) and PE settings (Miller, 1985). Despite its limited use the combination of activity measures with this systematic observation method has the potential for yielding insightful data pertaining to impact teacher behaviors and student PA. Therefore, the purpose of this study is to use ORRPETB to:

1.) Analyze teaching behaviors that are displayed during PE.

2.) Identify teaching behaviors that may contribute to higher PA levels during physical education.

Methods

Participants

A convenience sample consisting of nine PE teachers (Female = 5)[1], all Caucasian with an average of 11 years (range: 1-24 years) of teaching experience were utilized for this study. Student participants included 244 children ages 7-11 (124 female). Mean age for students was 9.2 (± 0.9) years, with an ethnic makeup of 124 Caucasian, 58 African Americans and 62 of other ethnic descent. Participants were included in part due to their school's use of evidence-based PE curricula such as SPARK, Dynamic Physical Education for Elementary School Students, and Fit for Life. All participants in the recruitment took part in their regularly scheduled PE class. Informed consent was collected from all students' parents and teachers included in the study. Assent was obtained from the students each time a PE lesson was observed. All protocols and procedures were approved by the institutional review board of the University of Kentucky.

Instrumentation

Observational Report for Recording Physical Educator Teacher Behavior. The Observational Report for Recording Physical Educator Teacher Behavior (ORRPETB) is a multidimensional systematic observation method that can be used for recording the instruction climate, interaction between teacher and student, and teacher behavior, or any combination thereof (Stewart, 1979). This method addresses teacher behavior directly by assessing teacher behavior, and indirectly by assessing the

[1] One PE teacher was excluded from statistical analysis due to significant differences in lesson length.

performance of their students. The method consists of 27 observable teacher behavior variables (referred to as *teacher behavior*), four student behavior variables (referred to as *climates*), and five teacher-student interaction variables (referred to as *interactions*).

Figure 2: Definitions of ORRPETB outcome variables.

Outcome Variable	ORRPETB definition of variable
Climate	Refers to the indirect assessment of teacher performance and are determined by what the students (>51%) of the class are doing.
Interactions	Refers to the times that the teacher initiates verbal or nonverbal communication towards a student or group of students or responds either verbally or nonverbally to student behavior.
Teacher Behavior	Refers to the decisions made by the teacher during the lesson or the teachers reaction to the student behavior.

Student physical activity levels. There are multiple methods for measuring the activity levels of youth (Trost, 2001). For this study students' activity levels were collected via a sealed FitStep Pro pedometer (GOPHER). This pedometer measures total steps taken, activity time; total time the user is in motion, and MVPA. The MVPA of students was measured by calibrating steps per minute (SPM) by individual user. For this study SPM was set to 120 steps-min^{-1}, a threshold that provides the best estimate for the participant population (Beets, et al., 2011).

Data Collection

The ORRPETB method was used to analyze 19 PE lessons (n=7 – 3rd grade, n=4 – 4th grade, n=8 – 5th grade) lasting, on average, 43 minutes (range 33.16 – 48.28 mins.). PE lessons observed varied in content; fitness (3), individual sport (11) and team sport (7) were all seen as the focal content of the lessons. Lessons were digitally recorded and used for systematic observation. An additional observer was trained by a previously experienced ORRPETB observer to establish interobserver reliability. Actual data analysis began only if interobserver agreement (IOA) (# agreements / [# agreements + #disagreement] X 100) exceeded 85% on each individual observation.

During PE lessons five-second intervals were used to maintain a high rate of correspondence between the actual behavior and observed behavior. When recording the climates, interaction and teaching behavior, the observer recorded those that occurred for the longest duration during the five-second observation interval as the principal behavior. After the ORRPETB method was used on the duration of the lesson, results were condensed into an ORRPETB summary. The results of the summary were further condensed within the teacher behavior variable. Original outcome *teacher behaviors* variables and the corresponding condensed teacher behavior variables can be seen in Figure 3.

Figure 3: Condensed ORRPETB Teacher Behavior Variables (continued)

Condensed Variable	**Original Variables Included**	**Variable Identifier**
Lectures/Orients	Lectures/Orients	LO
Field and Responding to Questions	Ask Questions, Listening, Answering Questions	AQ, L, WQ
Monitoring	Monitoring, Teacher Officiating	MO, TO
Managing	Managing	MG
Modeling	Teacher Modeling +, Student Modeling +, Teacher Modeling -, Student Modeling -	TM+, SM+.

Behavioral Feedback	Praise General, Praise Specific, Hustling	TM-, SM-PG, PS, H
Skill Feedback	Skill Feedback General +, Skill Feedback Specific +	FG+, FS+
Skill Feedback - Corrective[2]	Corrective Feedback +, Corrective Feedback -	CF+, CF-
Undesirable Behavior[3]	Nagging, Getting Nasty, Punishment, Teacher Participation, Non-functional	N, N-, P, TP, FG-, FS-, NF

Note: Original variables were condensed due to similarities in operational definition and to allow researcher to run statistical analysis to determine significance.

As students arrived to the PE class, a trained researcher placed a pedometer on an effective location on student's waist band (Pangrazi, Beighle, & Sidman, 2007). Following the conclusion of the lesson each pedometer was removed from student and pedometer data were uploaded to the FitStep Pro MAC Version 3.4.

Data Analysis

All statistical analyses were completed using IBM SPSS Statistics (Version 24, Armonk, NY). General descriptive statistics were calculated for ORRPETB variables and pedometer derived activity for students. Reliability for ORRPETB variables was achieved through interobserver agreement on each lesson that was observed (>85%). To examine the linear relationship between ORRPETB outcome variables and student activity levels (% activity time and % MVPA) a Pearson Correlation analysis was

[2] Skill Feedback – Corrective was separated from Skill Feedback due to the number of observed intervals within the category.

[3] Undesirable Behaviors were determined in part due to the literature that supports their exclusion from the classroom (Pangrazi & Beighle, Dynamic physical education for elementary school children (18th edition), 2015) and the relatively small amount of times these behaviors were observed (<4%)

conducted. Additionally, a bivariate linear regression was calculated to predict the impact condensed teacher behavior variables had on student activity (%) and MVPA (%).

Results

Observational Data

The frequency of ORRPETB variables are presented in Table 1. A total of 5,343 intervals were recorded. The majority of the lesson climate was spent in activity (64.5%), followed by instruction (20.1%), management (10.8%), and waiting (4.6%). Interactions between the teacher and student revealed that teachers spent on average 59% of their lessons interacting with the whole class. Teachers interacted with individuals 32% (52% male, 48% female) and small groups, on average, 8% of the time. Interactions that consisted of the teacher interacting with only all-male students or only all-female students did not occur.

ORRPETB data indicate that, on average, teachers spent 27% of lesson time lecturing/orienting and 24% of lesson time monitoring their students. The next most common condensed teacher behavior was managing (13%), followed by fielding and responding to questions (10%), skill feedback – corrective (9%), behavioral feedback (7%), modeling (5%), undesirable behavior (3%), and skill feedback (2%)

Table 1: Incidence of climates, interactions, and teacher behaviors amongst all observations (continued)

Variable	% of intervals recorded during lessons (Mean)	Std. Deviation
Climate:		
Management	9.25	3.89
Instruction	23.30	5.25
Activity	63.09	8.19
Waiting	4.54	3.39
Interaction:		
Individual Male (M)	49.21	7.78

Individual Female (M)	50.78	7.78
Individual	38.04	8.94
Group	5.43	4.30
Class	56.72	7.85
Teacher Behavior:		
Lectures/Orients (LO)	27.08	5.42
Field and Responding to Questions (AQ, L, WQ)	9.77	5.03
Monitoring (MO, TO)	24.14	8.66
Managing (MG)	12.83	5.04
Modeling (TM+, SM+)	5.41	3.09
Behavioral Feedback (H, PG, PS)	7.01	3.74
Skill Feedback (FG+, FS+)	2.33	2.41
Skill Feedback - Corrective (CF, CF+)	8.58	3.28
Undesirable Behavior (N, N-, P, TP, NF)	3.08	1.94

Table 2: Percentage of individual teacher incidence of outcome variable; climate, interaction and teacher behavior (continued)

	Teacher							
	1	2	3	4	5	6	7	8**
	% (SD)	% (SD)	% (SD)	% (SD)	% (SD)	% (SD)	% (SD)	% (SD)
Climate:								
Management	7.3 (3.01)	11.2 (1.86)	6.1 (2.26)	7.6 (1.55)	11.8 (5.11)	7.3 (1.76)	8.4 (1.55)	18.8
Instruction	26.8 (1.29)	25.1 (1.25)	20.1 (2.33)	18.9 (2.05)	25.9 (8.89)	14.6 (2.96)	24.7 (3.39)	25.7
Activity	63.9 (3.75)	59.2 (2.63)	70.9 (6.15)	71.6 (4.38)	59.3 (14.49)	67.5 (7.21)	59.2 (2.26)	49.2
Waiting	2.0 (1.20)	4.4 (.755)	2.9 (1.48)	1.9 (.707)	3 (2.10)	10.8 (6.01)	7.7 (.424)	6.3
Interaction:								
Individual (M)	42.2 (6.60)	53.7 (4.70)	53.6 (2.54)	46 (1.62)	58.6 (6.36)	49 (12.72)	44.9 (.565)	42.4
Individual (F)	57.8 (6.60)	46.3 (4.70)	46.4 (2.54)	54 (1.62)	41.4 (6.35)	51 (12.72)	55.1 (.565)	57.6
Individual	42.7 (4.78)	43.2 (1.41)	41.3 (1.20)	30.7 (.212)	41.2 (6.85)	23.8 (3.39)	39.7 (1.34)	28.1
Group	2.6 (2.41)	5.3 (.900)	7.7 (6.15)	6.1 (.777)	6.7 (7.90)	10.9 (3.95)	2.1 (1.41)	3.6

Class	54.9 (3.34)	52.5 (1.52)	51 (7.35)	63.0 (1.14)	52.5 (14.2)	65.3 (7.35)	58.2 2.68	68.3
Teacher Behavior:								
Lectures/Orients (LO)	28.3 (2.97)	29.1 (1.60)	21.9 (8.55)	30.7 (1.20)	29.2 (6.78)	17.3 (2.75)	27.9 (.353)	31
Field and Responding to Questions (AQ, L, WQ)	12.2 (3.57)	12.1 (2.47)	9.5 (.989)	4.2 (.495)	15.2 (7.70)	6.6 (.848)	4 (.282)	6.9
Monitoring (MO, TO)	18.6 (4.16)	23.5 (1.55)	23.5 (4.03)	42.7 (2.12)	14.7 (.953)	31.2 (.495)	28.9 (1.83)	17.5
Managing (MG)	10.3 (5.37)	11.6 (1.32)	13.2 (4.24)	10.5 (1.13)	11.5 (9.02)	20 (3.74)	14.9 (1.97)	16.2
Modeling (TM+, SM+)	9.3 (2.48)	7.3 (1.45)	4.9 (1.62)	2.4 (.424)	4.9 (3.33)	3.1 (.707)	3.4 (.777)	1.7
Behavioral Feedback (H, PG, PS)	6.4 (2.87)	4.6 (2.00)	10.5 (3.32)	2.8 (.989)	10.7 (4.73)	9.7 (4.03)	4.4 (.212)	7.3
Skill Feedback (FG+, FS+)	.88 (.629)	2.3 (.850)	7.7 (4.03)	1.1 (.495)	1.3 (1.85)	1.2 (1.13)	3.5 (.000)	3.3
Skill Feedback - Corrective (CF, CF+)	11.5 (2.35)	8 (1.88)	6.5 (.707)	4 (.212)	9.3 (5.93)	6.9 (1.20)	9.8 (.424)	10.2
Undesirable Behavior (N, N-, P, TP, NF)	2.4 (1.02)	1.4 (.750)	2.3 (.495)	1.5 (1.27)	5.5 (2.98)	4.1 (.424)	3.4 (.212)	5.9

*** Std Deviation not included, teacher was observed during only one lesson.*

Activity Data

A total of 244 students (124 female) wore a pedometer during at least one observed PE lesson (n = 19). On average, students accumulated 24:08 (± 4:37) minutes of PA and 15:30 (± 4:19) minutes of MVPA out of an average class time of 44 minutes. Thus, students were active 55% of time and were engaged in MVPA 36% of time. Additional descriptive data on student activity are presented in Table 3. Descriptive data by teacher can be found in Table 4.

Table 3: PE lesson descriptive statistics for all teachers

Descriptive Statistics			
	N	Mean	Std. Deviation
Recorded Class Time (min)	19	43.6	4.05
Average Student Step Count	19	2903.79	690.07
Average Activity Time (min)	19	24.13	4.62
% Activity Time	19	55.34	9.87
Average MVPA (min)	19	15.5	4.32
% MVPA - Total Class Time	19	35.89	8.73
Valid N (listwise)	19		

Table 4: Student PA and MVPA by teacher (per lesson)(continued)

	Descriptive Statistics				
Teacher	Lesson #	Activity Time	% of lesson time	MVPA	% of lesson time
1	1	18.05 (3.08)	41.7	11.23 (2.88)	25.9
	2	27.62 (5.50)	60.4	17.41 (5.86)	38.3
	3	24.45 (6.36)	52.6	15.43 (5.86)	33.4
	4	22.35 (5.31)	51.8	14.60 (4.62)	33.8
	Mean	23.02 (4.02)	51.6	14.67 (2.58)	32.9
2	1	27.85 (6.15)	59.6	17.05 (4.03)	36.5
	2	23.75 (12.91)	49.6	12.77 (7.50)	26.7
	3	20.66 (6.16)	49.9	11.91 (5.10)	28.8
	Mean	25.23 (2.28)	53.0	14.58 (2.22)	30.7
3	1	30.93 (4.00)	73.5	22.91 (3.75)	54.5
	2	20.68 (7.00)	48.4	11.73 (6.22)	27.3
	Mean	25.87 (7.17)	61.0	17.31 (11.33)	40.9
4	1	30.96 (9.50)	73.7	25.08 (8.08)	54.4
	2	31.98 (3.85)	69.9	23.10 (3.88)	50.5
	Mean	32.98 (1.40)	71.8	24.08 (1.40)	52.45
5	1	18.83 (3.75)	47.7	12.01 (3.42)	31.4
	2	21.18 (6.11)	63.9	13.01 (4.50)	39.2
	3	19.36 (3.26)	53.4	10.52 (2.57)	29.0
	Mean	19.80 (1.23)	58.7	11.85 (1.25)	33.2
6	1	25.01 (3.23)	61.0	16.85 (4.67)	41.1
	2	21.91 (3.57)	50.0	12.47 (4.07)	28.6
	Mean	23.47 (3.95)	55.5	14.67 (3.10)	34.9
7	1	25.31 (4.16)	55.5	18.77 (4.88)	41.1
	2	22.95 (4.95)	50.8	14.32 (4.40)	32.0

	Mean	24.13 (1.67)	53.15	16.55 (3.15)	36.6
8	1	18.21 (11.42)	38.0	11.38 (3.72)	23.7
	Mean	18.21 (11.42)	38.0	11.38 (3.72)	23.7

Correlation coefficients were computed to examine the relationship between all condensed ORRPETB teacher behavior variables (lectures/orients, field and responding to questions, monitoring, managing, modeling, behavioral feedback, skill feedback, skill feedback – corrective, undesirable behavior) and student activity levels (% of class time) and MVPA (% of class time). The results of the analysis can be found in Table 5. The correlation analysis shows that the "monitoring" condensed teaching behavior variable has a significant effect on the students' activity with p-value (<0.01), which means in one class, each increase of one percentage unit of the "monitoring" condensed ORRPETB teacher behavior variable will lead to a 3.52% (slope) increase on the students' activity. No other *teacher behavior* variables showed any significant effects on student PA or MVPA.

Table 5: Correlation Coefficients for Teacher Behavior Variables; Student Activity (min) and MVPA (min)(continued)

Variable		Student Activity (%)	MVPA (%)
Teacher Behavior			
Lectures/Orients (LO)	Pearson Correlation Significance N	-.131 .592 19	-.105 .670 19
Field and Responding to Questions (AQ, L, WQ)	Pearson Correlation Significance N	-.143 .559 19	-.320 .181 19
Monitoring (MO, TO)	Pearson Correlation Significance N	.628** .004 19	.671** .002 19

Managing (MG)	Pearson Correlation Significance N	-.117 .633 19	-.168 .493 19
Modeling (TM+, SM+)	Pearson Correlation Significance N	-.172 .482 19	-.190 .435 19
Behavioral Feedback (H, PG, PS)	Pearson Correlation Significance N	-.163 .504 19	-.133 .587 19
Skill Feedback (FG+, FS+)	Pearson Correlation Significance N	.125 .610 19	.217 .372 19
Skill Feedback - Corrective (CF, CF+)	Pearson Correlation Significance N	-.374 .114 19	-.359 .131 19
Undesirable Behavior (N, N-, P, TP, NF)	Pearson Correlation Significance N	-.353 .138 19	-.369 .120 19

*** Correlation is significant at the 0.01level (2-tailed)*

A linear regression analysis was conducted to evaluate the prediction of student activity time (minutes), MVPA and the condensed teaching variables. A significant regression equation was found for the "monitoring" condensed teaching behavior ($F(1,7) = 11.054$, $p < .01$), with an r^2 of .713. A significant regression equation was also found for student MVPA (minutes) ($F(1,7) = 13.934$, $p < 01$), with an r^2 of .701. Furthermore, when analyzing the coefficient for the "monitoring" condensed teacher variable, it is predicted that a 1% increase in the condensed "monitoring" behavior will lead to a .715% increase in student activity and a .724% increase in student MVPA. No other regressions were found to significantly predict student PA or MVPA when individual condensed teacher behaviors were the independent variable. All other regression data are presented in Table 6.

Table 6: Simple Regression Analysis Results: Student Activity (minutes) and MVPA (minutes)

Teaching Behavior	*Average Activity (%)*			*MVPA(%)*		
	r^2	SER	Sig.	r^2	SER	Sig.
Lecture/Orients (LO)	.017	10.07	.592	.011	9.57	.670
Field and Responding to Questions (AQ, L, WQ)	.018	10.07	.587	.103	9.12	.181
Monitoring (MO, TO)	**.394**	**7.91**	**.004**	**.450**	**7.13**	**.002**
Managing (MG)	.014	10.09	.633	.028	9.49	.493
Modeling (TM+, SM+)	.029	10.01	.482	.036	9.45	.435
Behavioral Feedback (H, PG, PS)	.027	10.02	.504	.018	9.54	.587
Skill Feedback (FG, FS)	.016	10.08	.610	.047	9.39	.372
Skill Feedback – Corrective (CF, CF+)	.140	9.42	.114	.129	8.98	.131
Undesirable Behavior (N, N-, P, TP, NF)	.125	9.51	.138	.136	8.94	.120

Note: All models were run separately for each variable; bold indicates variable that is a significant predictor at the $p \leq 0.01$.

Discussion

Increasing PA amongst children and adolescents has been identified as a public health need. The school setting is an ideal environment for the promotion of PA; specifically, PE has shown to positively contribute to the PA levels of youth (CDC, 2017). However, little is known about teaching impact behaviors that are displayed during PE lessons that may contribute to this positive student outcome. This study provides empirical data that identifies teaching impact behaviors that contribute to the PA levels of students during PE lessons. The three outcome variables in this study (*climate, interactions,* and *teacher behaviors)* reveal unique insights into PE lesson structure, PE teacher behaviors and their individual effect on PA and MVPA.

Climate

Climate, that is, the variable that indicates student behavior during the interval period, provided valuable insight into the PE lessons structure. For instance, the three teachers whose students spent, on average, the highest percentage of time in the

"instruction" *climate* (>25.5%) had the lowest percentage of student activity (< 25 min.). This suggests that during these lessons students are spending a quarter of their lesson time inactive. Other studies have also found that instruction is prevalent during PE lessons (Hannon, Destani, McGladrey, Williams, & Hill, 2013; Rasmussen, Scrabis-Fletcher, & Silverman, 2014; Weaver, et al., 2016; Yu & Kim, 2010). However, these studies found that approximately 50% of lesson time was spent in the "instruction" *climate.* The variation in incidences between studies could be due to the individual observational methods classification of "instruction." For instance, "instruction" in the SOFIT coding system codes lesson context multiple ways (general content, knowledge content). ORRPETB codes "instruction" as instructional time in which students are not engaged in PA (>51%), but the opportunity to learn is present. For example, while stationary students may be listening to a lecture, watching a teacher or student model a skill, or answering teacher questions.

Along with the "instruction" *climate* variable, teachers whose students spent less time in the "management" *climate* exhibited higher levels of PA and MVPA. In other words, the less time teachers spent moving students to lines, getting equipment, or providing prolong bouts of instruction the more active students are. While intuitively this makes sense, the data provide empirical evidence to support the claim that excessive management and instruction yield less active students. The current data are also consistent with other research examining management and instruction that has found a negative relationship between time spent instructing and managing and student activity time (McKenzie, et al., 2001 & McKenzie, Sallis, & Nader, 1992).

Lonsdale et al. (2103) suggest that reducing transition time between PA, maximizing student opportunity to be active, and integrating fitness activities into more sedentary activities can increase the amount of PA students acquire during PE lessons. Therefore, the frequency of the "activity" variable within *climate* is encouraging. "Activity" was found, on average, in 63% of intervals recorded for the variable. Recall, "activity" here refers to the period of time in class when > 51% of the students are involved in actual physical movement that is consistent with the specific goals of the lesson. This indicates that students were engaged in "activity" 63% of the recorded class time. Moreover, the two teachers whose students engaged in the highest percentage of time within the "activity" *climate* also had, on average, the highest percentage of student activity and MVPA as measured via pedometry. The 63% "activity" indicator variable within climate is higher than other studies that have analyzed lesson *climate* or context (Fairclough & Stratton, 2006). Yet, ORRPETB measures students as "active" when >51% of them are engaged in an activity. Consequently, students that are stationary, but engaged in an activity are considered "active." Likewise, a sedentary *climate* ("managing", "instruction", "waiting") may be observed when < 51% of students are engaged in PA, thus activity outcomes measured by ORRPETB should be used only to give a framework to the primary outcome variable (teaching impact behaviors) and not as evidence of student activity.

Interaction

The *interaction* variable measured using the ORRPETB method shows that teachers spend a majority of their time throughout all behaviors with the "class" as a whole (57%). This variable connects the student behavior (*climate)* to the teacher

behavior (*teacher behaviors)* by indicating with whom the *teacher behavior* is occurring. Data gathered in this study are reflective on teacher-student interactions that indicate that a majority of interactions during PE occur within a whole class environment (Hastie, 1994). In other words, teachers interact with small groups and individuals during the lesson far less often than the entire class. Current data suggest teachers spent only 43% of their lesson time interacting with small groups or individuals. Interactions that are done with an individual or small group allow teachers to make instructional adaptations, build interpersonal relationships with students and ultimately create a positive motivating learning climate (Weidong, 2015). Thus, QPE would aim for a high percentage of interaction with individuals and small groups. High percentages of whole "class" *interactions* also indicate that the "teaching style" that is being utilized during the lesson is more teacher-centered (Lombardo & Cheffers, 1983). A more student-centered approach has been advocated for, thus *interactions* between the teacher and student should be more individualized or contained within small groups (Cornelius-White, 2007). However, it should be noted that certain lesson content may impact the amount of individual and group interactions that occur during a PE lesson. Specifically, instructional models that accompany the lesson could impact the number of *interactions* that the physical educator could have with individuals and/or groups (Metzler M. , 2017). To promote learning and facilitate PA student-teacher *interactions* should vary between whole class, small group and individuals throughout the lesson (Gillies, 2008). Although these *interactions* should be contextually relevant and aligned with lesson outcomes interactions (Goodyear & Dudley, 2015).

Teacher Behaviors

The primary outcome variable measured in this study was *teacher behaviors,* that is the behaviors that the teacher is displaying during the lesson (impact teaching behaviors). The lecturing/orienting *teacher behavior* variable, a variable that indicates the teacher is giving facts or opinions about content or expressing his or her own ideas or the ideas of someone else, was the most common behavior displayed by the PE teachers in the current study. This is reflective of other studies (Behets, 1997; Lacy & Darst, 1984; LaMaster & Lacy, 1993; Siedentop & Tannehill, 2000) that suggest this behavior to be the most prevalent impact *teacher behavior* displayed during PE lessons. Teachers who displayed the highest percentage of lecturing/orienting behaviors most often had the lowest percentage of student participation in the "activity" *climate*. Also, when combining the lecturing/orienting *teaching behavior* variable with the modeling *teaching behavior* variable, teachers spent, on average, 30% of classroom time performing a predominantly stagnant instructional practice. The majority of these instructional practices were done within the "class" *interaction* variable (83%) and had the majority of students in an "instruction" *climate* (78%). Modeling skills is considered best practice (Pangrazi & Beighle, 2015) however, these practices were observed only 5% of lesson time. Fundamentally, while modeling is considered best practice, it is hypothesized that it may be more impactful in individual or small group instruction and may increase positive student outcomes (Sallis, Prochaska, & Taylor, 2000), however the current analysis did not examine this *teacher behavior* in relation to lesson *climate*. Therefore, it is unknown if modeling occurred more often within a specific *climate* (i.e., class, group, individual).

Teacher four was an outlier within the data in regard to the impact that the lecturing/orienting *teacher behavior* variable had on student PA and MVPA. This teacher

lectured/oriented, on average, 31% of the observed lesson time (29.8%, 31.5%), however, her student PA and MVPA minutes measured by pedometry were, on average, the highest recorded (32.98, 24.08). This could be due to the percentage of time this teacher also displayed the monitoring *teacher behavior* (43%). As an illustration, this teacher essentially gave facts or opinons about content, expressed facts or opinons and displayed limited other impact behaviors that are believed to be beneficial to positive student outcomes (i.e., fielding and responding to questions, behavioral feedback, skill feedback, modeling). Additionally, the *teacher behaviors* displayed by this teacher prodimantly occurred within the "class" *interaction* variable (63%) suggesting that the teacher spent the majority of the lesson observing the class without reactive verbally to the behaviors of the students, a practice that should be avoided (SHAPE America, 2015)

"Monitoring" was also the only *teacher behavior* that was a signficant predictor of PA and MVPA ($p < .01$). The relationship between the "monitoring" *teacher behavior* and PA and MVPA suggest that teachers who monitor their students are in essence providing more time for students to be more active by not interfering with activity time by providing instruction. In other words, this behavior is similar to supervision of activity. It should be noted that student PA and MVPA are not the sole positive student outcomes valued in PE (McKenzie & Lounsbery, 2013; Rink, 2013) and that it could be argued that "monitoring" for extended periods of time during PE is not PE at all, but more like recess. This point draws attention to the need for balance between activity and instruction during physical educaiton lessons.

The condensed variables, that is, the original ORRPETB variables that have been consolidated for the analysis, indicates that teacher feedback makes up, on average, 19%

of the observed *teacher behaviors*. This finding is also reflective of other studies that have analyzed physical educator teacher behavior and found that providing feedback is a prominent behavior in PE lessons (Yu & Kim, 2010). However, ORRPETB allowed the observer to further analyze the type of feedback that is given to the students. The most common condensed feedback variable observed for *teaching behavior* was "behavioral feedback" (9%); this is feedback that was identified as non-skill related but could be either general or specific in nature. For example, the PE teacher could say "Good job", "Come on you can do it", or "Great job freezing and placing your hands on your knees." This type of feedback did not significantly contribute to the PA or MVPA of the students, however, this behavior is believed to be supportive of positive student outcomes related to autonomy and self-determined motivation (Deci & Ryan, 1985; Koka & Hagger, 2010). The percentage of positive behavioral feedback is insightful when compared to the percentage of time the PE teachers spent in undesirable behaviors (4%). These behaviors, specifically nagging (N), getting nasty (N-), and punishment (P), were seen less often than positive feedback behaviors. This is counter to the results of some research that suggest educators respond far more frequently to inappropriate behaviors than appropriate ones (Beaman & Wheldall, 2000; Deci & Ryan, 1985).

Skill feedback which is feedback that is focused on the skill being performed and corrective in nature, is seen more often in this study than skill feedback that is positive in nature (9%, 2%). This is problematic when considering that some suggest while corrective feedback can be effective (Silverman, Tyson, & Krampitz, 1992), too much may create a negative participatory environment (Pangrazi & Beighle, 2015). Furthermore, the amount of skill feedback that is not corrective in nature is relatively

low. Teacher participants in this study gave skill related feedback that was not corrective in nature, on average, 2% of the time during a PE lesson. This number when compared to the number of skill feedback intervals that were corrective in nature 9% of the time, a ratio that may not be supportive of student motivation. Moreover, skill feedback was the only other *teacher behavior* shown to have a positive relationship with PA and MVPA, although not significant. The complexities on the delivery and the response to particular types of feedback are well-documented (Lee, Keh, & Magill, 1993), and research suggests that providing verbal feedback on errors and the correctness of task is less efficient than giving verbal feedback on the correctness of the performance (Sadowski, et al., 2011). This is specifically recommended to teachers of less skilled or experienced students because of the perceptions of incompetence and low self-esteem that is associated with excessive corrective feedback (Kilpatrick, Hebert, & Jacobsen, 2002).

The teachers observed for this study also spent, on average, a limited amount of time fielding and responding to questions (10%). This *teacher behavior* did not have a significant relationship with the amount of PA or MVPA that students acquired. Nonetheless, the practice of fielding and responding to questions in PE has been analyzed and found to encourage positive student outcomes (Casey, Dyson, & Campbell, 2009) Therefore, this condensed *teacher behavior* variable is recommended to be utilized more often within PE lessons. Furthermore, incorporating effective questioning strategies and creating an environment that fosters student reflection through questioning may impact student outcomes in PE lessons by fostering critical thinking skills and prompt students to interact with each other (Siedentop & Tannehill, 2000).

Implications for Teachers

The results and implications therein that have been identified through this study serve as practical reminders that the teaching of PE is complex. Data from this study suggest that PE teachers spend high percentages of time in large group instruction, which in turn yields less time for activity, thus decreasing the overall amount of student PA and MVPA that can be gained through MVPA. Further, large group instruction is not advocated as a best practice for improving student skill or learning (Pangrazi & Beighle, 2015) . Therefore, limiting instructional bouts to large groups may lead to optimal outcomes associated with student PA and other learning.

In addition, the "monitoring" *teacher behavior* variable was the only *teacher behavior* variable that showed a significant positive relationship with student PA and MVPA. This should be interpreted carefully however. While "monitoring" was seen as a significant predictor of student PA and MVPA, it should also be noted that the inclusion of "monitoring" as predominant behavior in PE excludes several impact teaching behaviors that are considered best practice (i.e., fielding and responding to questions, modeling and skill feedback) that contribute to motor competency, skill acquisition, and general content knowledge. Therefore, excessive time spent in "monitoring" is not advocated.

Finally, this study provided data that categorically differentiated the types of feedback that PE teachers use during PE lessons. While providing positive behavioral feedback and specific skill feedback to students can have positive impacts on PA knowledge, skills and attitudes, providing disproportionate amounts of corrective feedback can stunt those desired outcomes. That is, teachers who provide only corrective feedback with minimal or now positive feedback, could be creating a negative physical

education environment. Thus, PE teachers would be prudent to balance the amount of feedback that is corrective in nature with other types of feedback.

Limitations

The limitations of the current study include the limited use of the systematic observational method as a measurement of teacher behaviors. Although ORRPETB has been used on a minimal basis sense its creation, this method provides practical insights into impact teacher behaviors that are displayed during PE. The lack of use as an observational method could be due to the rigorous nature of the analysis that accompanies its use. Future studies that utilize ORRPETB as a measurement method should consider using condensed *teacher behavior* variables to guide their observations, instead of using all 27 ORRPETB *teacher behavior* variables.

Also, the generalization of these findings are limited due to sampling. The convenience sample that was utilized in this study would be more representative of the population if more participants were included. Moreover, a greater number of PE lessons observed would have given a more valid representation of the study's outcome variables.

Finally, while the use of pedometers to measure PA and MVPA is typical practice, a more accurate and valid measure of PA and MVPA would have been the use of accelerometry. Future studies should include other types of PA measurements such as accelerometers and heart rate monitors to obtain higher quality PA measures. However, pedometers are unobtrusive and cost-effective for teachers and researchers to utilize.

Future Research

This study provides practical data to supplement current research analyzing the effect teacher behaviors can have on student PE outcomes. Future research must continue to attempt to reveal teacher impact behaviors that influence desirable PE outcomes. In the current study, teacher impact behaviors were analyzed to establish their impact on student PA and MVPA. Further research is needed to analyze teacher impact behaviors and their potential effect on content knowledge, PA attitudes and other appropriate PE outcomes.

Additionally, future research should utilize systematic observation methods like ORRPETB that specifically analyze teacher impact behaviors. Coupling the utilized condensed teacher impact behavior variables with other methods like SOFIT+, ALT-PE or other systematic observation methods may yield insightful data and lead to a better understanding of the influence specific teacher behaviors can have on student PE outcomes.

Further research should also be encouraged, when analyzing teacher behaviors and their impact on student outcomes, to examine differentiated feedback variables. The current research on feedback is extensive, however, it may be pragmatic to investigate the potential negative impacts that disproportionate amounts of corrective feedback can have on desirable student outcomes, such as student PA levels.

Finally, ORRPETB along with other systematic observation methods should be used to analyze the types of interactions that are occurring during PE. In this study, whole "class" interactions did not have a significant impact on student PA or MVPA. However, it is hypothesized that whole class interactions along with high amounts of teacher "talk time" may negatively impact the desired outcomes of QPE.

Conclusion

The descriptive information in the current study identifies some important characteristics of PE impact teacher behaviors. Identifying "monitoring" as an impact teacher behavior that contributes significantly to the activity levels of students provides useful variable data. Despite this teaching behavior variable's potential to increase student activity and MVPA, PE specialists should attempt to balance the amount of monitoring that occurs in their classrooms with other desirable impact behaviors (i.e., providing skill feedback – non-corrective) while limiting impact behaviors that negatively impact PA (i.e., managing, skill-feedback corrective, etc.). Increased PA levels for students should be a primary goal of QPE, however, other outcomes related to physical literacy, specifically, the knowledge, skills, and attitudes towards PA, cannot be sacrificed. Instead, emphasizing impact behaviors that have positive relationships with student activity, such as behavioral and skill feedback, fielding and responding to questions, and modeling should be utilized during individual and small group activities to not only promote PA within the PE class, but instill the knowledge, skills, and attitudes that will lead to lifelong PA.

.

Appendices

Review of Literature

Prevalence and Health Related Outcomes of Obesity. The interest the public health sector has shown in physical education (PE) has expanded exponentially over the past 30 years (Sallis J. , et al., 2012). This is in part due to the portion of America's youth who are considered obese. Obesity rates are defined by the body mass index (BMI; weight in kilograms divided by height in meters squared) of an individual (Krebs, et al., 2007). One recent analysis indicated that 17% of the youth population aged 2-19 in America is obese (Ogden, et al., 2016). Obesity rates have risen threefold since 1970 and continue to show an upward trend (Fryar, Carroll, & Ogden, 2016). These rates remain high despite evidence suggesting obesity can lead to high blood pressure, type 2 diabetes in children, as well as other chronic diseases that track into adulthood (Singh, Mulder, Twisk, van Mechelen, & Chinapaw, 2008). Furthermore, psychosocial complications including poor self-esteem, depression and eating disorders have been linked to childhood obesity (Strauss, 2000). Leptin deficiency, growth hormone deficiency, and other genetic disorders such as hyperthyroidism have been identified as contributing factors in the childhood obesity epidemic (Dehghan, Noori, & Merchant, 2005). However, environmental factors that impact personal lifestyle choices related to energy intake and energy expenditure have been shown to more significantly influence the current obesity rates (Lustig, 2001).

Causes for Obesity in the Youth Population. In conjunction with factors that promote energy intake, environmental factors such as increased media availability and

usage (watching television or videos, playing video or computer games) has decreased energy expenditure while increasing bouts of inactivity (Trost, Kerr, Ward, & Pate, 2001). The technological advances that have been made have increased the amount of time that children spend being sedentary while decreasing the intensity levels and duration of their activity (Andersen, Crespo, Bartlett, Cheskin, & Pratt, 1998). To limit the amount of youth who are plagued by the symptoms of obesity and to counteract the environmental factors that promote such symptoms, a national call for increased physical activity (PA) has been made (U.S. Department of Health and Human Services: Office of Disease Prevention and Health Promotion, 2014).

Youth PA and its Benefits. Increased PA has been advocated for by the public health sector sense the release of the 1996 Surgeon General's Report on Physical Activity and Health (US Department of Health and Human Services, 1996). Following the Surgeon General's Report in 1996 efforts to increase PA were focused on the youth population. In 2008, the U.S. Health and Human Services published the first federal government issued recommendations for PA titled *Physical Activity Guidelines for Americans (PAG)* (U.S. Department of Health and Human Services: Physical Activity Guidelines Advisory Committee, 2008; US Department of Health and Human Services, 2000). The report recommended that children and adolescents do 60 minutes or more of PA daily and that PA should consist of various intensity level (moderate to vigorous) aerobic, muscle strengthening, and bone strengthening activities. In 2018, those guidelines continue to recommend 60 minutes or more of PA daily that varies in intensity level (moderate to vigorous) aerobic, muscle strengthening, and bone strengthening activities, however these recommendations emphasize PA include vigorous-intensity

activity on at least 3 of these days. The new recommendations also place an emphasis on encouraging youth to participate in activities that are age appropriate, enjoyable and offer variety (Centers for Disease Control and Prevention, 2017).

In order to meet these recommendations policies and interventions that focus on the youth population have been put into place. Historically, schools have played a central role in the promotion of children's PA (Pate, et al., 2006). Schools are considered critical to children's PA (Pate, et al., 2006) and evidence suggest that school-based PA interventions are somewhat effective in increasing the number of children engaged in MVPA (Fairclough & Stratton, 2006). Additionally, schools provide a practical site in which public health issues can be addressed, such as inactivity (McKenzie & Lounsberry, 2014). Specifically, school day PE has been identified to provide regular and structured physical activity participation (Zeigler, 1994).

Generally, interventions have focused on providing students with knowledge about the benefits of PA and health nutrition, the risks associated with inactivity and unhealthy food choices, and increasing the amount of time students are engaged in PA (Dobbins, Husson, DeCorby, & LaRocca, 2013). Interventions that focus on the amount of time students are engaged in PA identify school curriculum changes, increased physical activity sessions, parental involvement, and community-based activities as reasons for increased PA (Dobbins, Husson, DeCorby, & LaRocca, 2013). Furthermore, emphasis on the inclusion of policies that promote PA have been recommended by leading governmental organizations. These policies include but are not limited to requiring daily PE, elementary school recess, and physical activity before and after

school (Pate, et al., 2006). Furthermore, SHAPE America recommends PE taught at all levels be taught by a certified PE teacher (SHAPE, 2015).

Despite school-based and other youth PA interventions and the policies that have been recommended by public health leaders, the youth population continues to fall short of PA recommendations (Bassett, Conger, Fitzhugh, & Coe, 2015) The 2016 United States Report Card on Physical Activity for Children and Youth provided a comprehensive evaluation of the physical activity levels of children and youth (Katzmarzyk, et al., 2016). The comprehensive report gave the United States (US) children and youth a grade of D- on the overall physical activity indicator variable. The D- grade was given because it found that 21.6% of children and youth aged 6-19 met the guidelines that have been established for PA (60 min/day). Along with the D- in overall PA levels, the report gave children and youth a D- in sedentary behaviors. This grade indicates that 37.2% of children and youth are currently meeting or under current screen time guidelines (<2hr.). The US was also given low grades on active transportation (F), organized sport participation (C-), health related fitness (D), and school (D+) indicator variables, The US did receive a B- in community and built environment, indicating that a majority of children and youth are living in neighborhoods with at least one park or playground.

CSPAP. Given the current levels of PA being acquired by youth, the potential negative impact a lack of PA can have on the overall health of America's youth, outlined above, and an increased focus on standardized testing in schools (Kann, Collins, Pateman, & Samll, 1995) a new approach that includes comprehensive guidelines for youth PA is gaining traction. The CDC has called for schools to implement

Comprehensive School Physical Activity Programs (CSPAP) with quality PE as its centerpiece. This comprehensive program includes before, during, and after-school physical activity through recess and other physical activity breaks, intramurals, interscholastic sports, walk- and bicycle-to-school initiatives, as well as, quality physical education (QPE). A CSPAP attempts to provide a variety of school-based physical activities that enable all students to meet the recommendations of 60 minutes of MVPA each day while also providing coordination throughout components to maximize children and youth's understanding, application and practice of knowledge and skills learned in PE. A step by step guide for a physical activity leader (PAL) in the school for incorporating the CSPAP was laid out as well. These steps include; establishing a team/committee and designating a PAL, conducting a needs assessment, creating a vision statement, goals, and objectives, identifying intended outcomes of the program, development of the CSPAP plan and evaluate (CDC, 2013). One promising study found that elementary physical education teachers that have high degree of buy in to the CSPAP model and that are well supported and prepared by their district offer more PA opportunities for students when compared to those who do not (Centeio, Castelli, Carson, Beighle, & Glowacki, 2014).

QPE. With the comprehensive guidelines established and the steps outlined, PE is in a more promising position than it has been in decades. However, Rink (2013) acknowledges that PE programs lack value in many schools. Thus, an emphasis has been placed on finding value through QPE which is viewed as the cornerstone of a CSPAP. QPE is PE that is multifaceted and includes, meeting the needs of all students, keeping students active for most of PE class time, teaches self-management, emphasizes

knowledge and skills for a lifetime of PA, and is an enjoyable experience for all students (Society of Health and Physical Educators, 2015).

Along with the abstract components of QPE outlined above, such as meeting the needs of all students and makes PE enjoyable for all students, QPE also focuses on developing physical literate children and youth through the incorporation of national standards and grade-level outcomes (SHAPE America, 2014). These standards and grade-level outcomes help guide PE teachers in their pursuit of physical literacy by placing an emphasis on student's pursuit of lifetime of healthful physical activity. Within QPE there are four components that provide the structure for this fundamental subject area include; policy and environment, curriculum, student assessment, and appropriate instruction. The policy and environment component include the expectations that schools provide daily PE in all grades, K-12, with instruction periods totaling 150 minutes/week (elementary) and 225 minutes/week (middle and high), the full inclusion of all students in PE, the exclusion of student exemptions, waivers, or substitutions for PE, the ratio of student to teacher aligned with other subject areas, and that PE classes be taught by certified PE teachers. The curriculum component of QPE outlines the outcomes of expected PE programs and recommends that schools have a written PE curriculum for grades K-12 that is sequential and comprehensive, that the curriculum is based on national standards and grade-level outcomes for PE, and mirrors other school curricula in its design and schedule for periodic review/update. The student assessment component indicates that student achievement should be aligned with national standards and grade level outcomes that is consistent with the written PE curriculum and administration protocols, uses evidence-based practices to measure student achievement in all areas of instruction, that

grading is directly related to student learning objectives, and that the PE teacher follows school protocols for reporting and communicating student progress. Finally, CSPAP outlines appropriate instruction components of QPE by identifying appropriate instruction as the use of instructional practices and deliberate-practice tasks that support the goals and objectives defined in the schools PE curriculum, the physical educator evaluates student learning continually to document teacher effectiveness, the physical educator employs instructional practices that engage students in MVPA for at least 50 percent of the class time, and that the physical educator ensures the inclusion of all students and makes the necessary adaptations for students with special needs or disabilities.

PE Teacher Effectiveness. Despite the delineation of recommended physical activity levels during PE, multiple studies have found that student engage in MVPA less than 50% of class time. (Fairclough & Stratton, 2006; Scruggs, et al., 2003). Thus, an examination of factors that impact student activity levels is warranted. Specifically factors examining the effectiveness of teachers in maximizing student physical activity levels. Thus, one way to measure teacher effectivness is the PA levels of students during their class. For example, research has identified tasks associated with the management of the class (i.e., taking attendance, making announcments, handling behavioral issues) occur far too often, thus decreasing the opportunity for PA in PE (Jago, et al., 2009).

While PA is an important outcome, it is important to emphasize that PA during PE is not viewed as a singular objective and the sole measure of teacher effectiveness. As mentioned above QPE is multifaceted. However, this creates difficulties when attempting to measure QPE. QPE and teacher effectiveness has been discussed through various

positions. Blankenship (2013) outlines two of these positions by identifying two distinct views of QPE. One view is that PE should focus on teaching student's knowledge about and motor skills needed to be physical active and to perform various physical activities. This view places an emphasis on making sure students know and can perform certain skills and places secondary emphasis on how physically active students are. She presents the alternative view as the other standpoint, in that, PE's primary objective should be to enhance student's PA. That is, skillfulness and knowledge should be a byproduct of providing students with maximal opportunities of PA. Blankenship ultimately concludes that it is possible to do both, although she does acknowledge its difficulties, she encourages PE teachers to find creative and intuitive ideas to increase knowledge and skill development while not sacrificing PA.

Lund (2013) argues that by placing an emphasis on PA PE teachers have taken the education out of physical education. She explains that merely having kids moving and providing them opportunities that are designed to only promote PA that the opportunity for learning is absent. Additionally, Lund activity is a process that PE teachers should utilize to achieve the goals of the class, not the actual goal of the class.

Rink (2013) provides another perspective on QPE by outlining the potential issues of linking student performance in any way to teacher effectiveness. She explains that the evaluation of student performance as a predictor of teacher effectiveness is problematic because of the unspecified primary outcomes of PE. While national, state, and local standards have been outlined, the unwillingness of many programs to hold practitioners accountable to those standards makes it impossible for students to be evaluated on their performance, thus making the evaluation as a measure of teacher effectiveness irrelevant.

In addition, she explains that measuring teacher effectiveness by holding teachers accountable for student performance when student ability varies in so many ways. Furthermore, Rink, explores the pitfalls in using current observation systems to measure effectiveness. She concludes that current measurement methods are not suitable in measuring teacher effectiveness and that quality evaluation methods should continue to be developed that minimally include measures of student performance.

From yet another perspective McKenzie and Lounsbery (2013) look at PE from a public health perspective. They explain that due to the cost-effective nature of schools as an area to address inactivity schools and PE can play a major role in reducing the sedentary behavior and population plaguing our nation. They specifically identify PE as the primary place in which public health issues can be addressed. They outline three primary objectives that should be strived for in PE, that is, curricular and instruction that (1) provides amply enjoyable opportunities for PA during class time, (2) teaches generalizable movement and behavioral skills and (3) encourages present and future PA and physical fitness (PF). Furthermore, they suggest that other recommended goals (i.e.-psychosocial outcomes) that are outlined in national standards become secondary and that PE specifically target PF and motor skill that include high-intensity levels.

A combination of these approaches to QPE might be the best approach. As Blankenship outlines, skills and knowledge are important to the success of PE, however, this should be a consequence of strategies that maximize practice time, thus, maximizing PA time. McKenzie and Lounsbury make a valid point, in that, ultimately the PE primary objective should be a furtherance of the public health agenda. Rink, also makes a valid argument that the PE field is not yet prepared to evaluate teacher effectiveness, and

therefore cannot rely on student outcomes as a measure. Therefore, establishing best practices from a teacher stand point and ultimately determining the effect these practices can have on various desired student outcomes is a necessity.

Research in PE Teacher Behavior. With the strengthening of PE teaching practice in mind, efforts to evaluate PE teachers as a means of helping them become more effective is warranted. Some of the difficulties that accompany evaluating the performance of physical educators is the lack of a consistent definition for teacher effectiveness (Rink, 2013). PE from a public health perspective is seen as one way to increase the amount of PA that children and youth are acquiring (McKenzie & Lounsbery, 2013; Pate, et al., 2006). Therefore, strategies that maximize the amount of PA students are getting in PE is paramount. Evidence suggest that reducing transition time between PA, maximizing student opportunity to be active and integrating fitness activities into more sedentary activities can increase the amount of PA students acquire during PE lessons (Lonsdale, et al., 2013). However, the public health sector has also concluded that activity levels in PE are only one measure of lesson quality and that PE lesson effectiveness is also measured by the inclusion of movement and behavioral skills that enable students to be active within and beyond the school setting (Lubans, Morgan, Cliff, Barnett, & Okely, 2010). Teacher effectiveness as outlined is highly debated due to the overall complexities of teaching and furthermore the unique complexities that are involved in teaching PE. One strategy for analyzing teacher effectiveness, measured by student PA outcomes, is to use direct observation to evaluate and critique the skills and behaviors that a teacher displays during a lesson that promote PA (Siedentop & Tannehill, 2000). This observational method has been used to analyze student activity

levels during PE, specific lesson context that contribute to activity during PE, and teaching behaviors that are displayed by the physical educators during a lesson.

Despite the differences in perspectives on teacher effectiveness, analyzing the behaviors that a teacher displays during PE that contribute to PA has not been examined extensively in the literature (Fairclough & Stratton, 2006). That is, teacher effectiveness is guided by teaching behaviors. Teacher behaviors are defined as; any action or characteristic that impacts the outcomes of classroom teaching (Flanders & Simon, 1969), therefore the variables that have been studied are numerous. The majority of research efforts in PE have focused on planning decisions; decisions that the teacher makes prior to the act of teaching (curriculum, instructional model, teaching style) and little on interactive decisions; decisions that the teacher makes during the act of teaching (Peterson, Marx, & Clark, 1978). Research that has been done on planning decisions has attempted to determine the effectiveness of various teaching styles or methods and the impact instructional models have on PE outcomes.

Research that has evaluated "planning decisions" in their main analysis has specifically looked at the impact instructional models may have on desired student outcomes. Instructional models are curriculum designs and methods that are formed to achieve certain outcomes (Metzler M. , 2017). These outcomes should be reflective of standards that are to be addressed within the lesson. However, the curriculum design or method does not necessarily dictate teaching behaviors used within the lesson (Eggen & Kauchak, 2001). PE instructional models include sport education, tactical games model, teaching games for understanding (TGfU), cooperative learning model, and achievement-based PE, to name a few. Within each instructional model there are strategies that help

with the implementation and dissemination of the content. For instance, TGfU is a model that breaks down sports into their basic form, then each skill associated with the sport is taught and placed back within the sport for performance (Bunker & Thorpe, 1982). Various teaching styles can be implemented within each individual instructional model, however some teaching styles are better suited for some instructional models. For example, when using the TGfU instructional model it is recommended that practitioners use a more student-centered style (Griffin & Butler, 2005). When referencing Mosston's categories for teaching behaviors, behaviors associated with instructional models would fall within the pre- and post-impact behaviors. Therefore, research focused on the incorporation of various instructional models has provided little insight into specific impact behaviors that contribute to positive student outcomes.

Another "planning decision" variable that has been measured extensively has been the use of various teaching styles and their potential impact on positive student outcomes. Teaching styles have been most commonly analyzed through "spectrum theory" a theory that states that teaching is governed by a single unifying process: decision making (Mosston, 1966). Decision making in the context of teaching style is then condensed into three primary teaching behaviors; pre-impact, impact, and post-impact (Mosston & Ashworth, 2002). These teaching behaviors play unique roles within each individual lesson, the pre-impact decisions are defined by planning and preparation decisions, the impact decisions are decisions that are related to face-to-face, transactive, and deal with task performance and the post-impact behaviors include decisions that deal with assessing student performance, providing feedback and reflection (Mosston & Ashworth, 2002). Teaching styles are often selected based on teacher experience, ability,

content, and the needs of the students and are maintained on a spectrum of teacher to student centered. Command or Direct style is teacher lead and typically has all students performing the same task as others at the same time in order to perform predicted outcomes. This style has also been categorized as a "reproduction" style or a style that has students reproduce or recall motor skills and known information (Morgan, Sproule, & Kingston, 2005). On the other end of the spectrum is the Learner-initiated style. This style is more student lead and requires less teacher interaction. This style assumes that the student is responsible for the designing and learning experience. Research suggest that a more student-centered teaching style is associated with higher levels of intrinsic motivation and task completion and lower levels of task avoidance (Goudas, Biddle, Fox, & Underwood, 1995). Furthermore, Weidong (2015) found that more student-centered teaching styles led to higher rates of engagement and the creation of interpersonal relationships between student and teacher. Mosston and other PE practitioners do however recognize that desired outcomes in PE are not developed by the utilization of only one teaching style, but the inclusion of multiple styles depending on a variety of educational variables. The research that has been done on teaching styles has focused more on the overall characteristics of individual styles and their impact positive student (Casey, Dyson, & Campbell, 2009). However, some research that focused on analyzing the impact-decisions of teachers found that providing individual feedback, organizing students into small groups, and creating an environment that is conducive to peer interaction to be beneficial to student outcomes (Mosston & Ashworth, 2002).

While most of the current research on teaching behaviors and their impact on student outcomes has focused on "planning decisions," other studies have chosen to focus

on “interactive decisions” and their potential impact on desired student outcomes. These studies have focused on analyzing teaching behaviors through the use of direct systematic observation (Lee A., 2003). This method allows the researcher to evaluate the “interactive decisions” or impact behaviors that are present during PE lessons. Research that uses systematic observation is typically used to analyze events that are occurring in the classroom. Systematic observation has been used as a research method in PE since the late 1960’s (Locke, 1977). The general objective of systematic observation in PE has been to record specific classroom events and activity in order to make judgements and recommendations on a number of teacher or student outcomes (Wright & Walkuski, 1995). While some have argued that the use of observational tools can be subject to personal biases (Van der Mars, 1989), many suggest that the use of systematic observation as a research method has contributed more information about teaching and possible solutions to teacher-preparation problems than any one method or tool (Darst, Mancini, & Zakrajsek, 1983 & Lee, 2003). Systematic observational methods in particular have shown promise when analyzing teacher impact behaviors. The Academic Learning Time-Physical Educaiton (ALT-PE), the Cheffers’ Adaptation to Flander’s Interaction Analysis System (CAFIAS), and the System for Observing Fitness Instruction Time (SOFIT) as well as other observational methods have been used in numerous studies. These observational methods use interval units to measure multiple variables within a lesson. The main objective of these observation tools is to examine teacher effectiveness by analying various variables. ALT-PE primarily focuses on what students are doing as an indicator of teacher effectiveness, therefore, studies that have used ALT-PE as the method of observation have focused mainly on student outcomes

(Siedentop, Birdwell, & Meltzer, 1979). However, some studies have focused on teacher impact behaviors and their impact on student outcomes. For example, one study used ALT-PE in combination with the Arizona State University Observation Instrument (ASUOI) (Lacy & Darst, 1984) and found that silence (33.53%), instruction (27.92%), and management (26.36%) were the most frequent teaching behaviors displayed by physical educators (LaMaster & Lacy, 1993). This study also found that the teacher spent low amounts of time providing feedback in the way of hustle and praise. Furthermore, the study indicated that the teacher used very little individualized teaching, a practice that is encouraged to promote positive student outcomes (Mosston & Ashworth, 2002). The study concludes that an effective teaching-learning environment that displays teacher behaviors such as active instruction (concurrent instruction), feedback (post instruction, hustle, praise) and active monitoring (silence) is associated with higher amounts of ALT. Furthermore, teacher behaviors such as lecturing (pre-instruction) and management are associated with lower amounts of students ALT.

Similar studies have analyzed teacher effectiveness in other ways and found similar results. Yu and Kim (Yu & Kim, 2010) attempted, when using the CAFIAS (Cheffers, 1972) systematic observation method, to analyze teaching impact behaviors and with whom those interactions occur. The study found that teachers spent more time lecturing and orienting (giving information and directions), fielding questions (guestioning), and providing feedback (critiquing) than all other observed behaviors. The study also found that teachers spent low amounts of time silently observing student practice (monitoring). Furthermore, the study found that teachers at the elementary school level included verbal and nonverbal praise more often than the other education

levels and that this behavior decreased as school or grade level increased. The study concluded that teacher behaviors that were most present within the classrooms (lecturing and orienting, fielding questions, and providing feedback) led to less than ideal student outcomes because it made students more passive in the learning process and more dependent on teacher direction.

Perhaps the most widly used systematic observation method to date is the System for Observing Fitness Instruction Time (SOFIT) (McKenzie, Sallis, & Nader, 1992). This method uses direct systematic observation to primarily analyze student PA levels during PE class. Secondarily, lesson context and instructor behavior are observed and recorded. SOFIT has provided vast amounts of empircal data on student PA and lesson structure. Scruggs, et al (2003) used SOFIT in combination with an activity measurement (pedometry) to collect data on student PA. The study found that pedometers were valid measures of PA and that during a 30-minute lessons, students, on average, spent 33.3% of their time in MVPA. McKenzie, et al (2004) found that males and females spent 53.2% and 48.6%, respectfully, of their PE lesson time in MVPA. However, it should be noted with both of these studies the primary outcome variable measured was student PA, therefore, PA was not attributed to any specific impact teacher behavior.

More recently, SOFIT, by the way of SOFIT+ has attempted to gain more insight on teacher practices related to the activity levels of the students. Weaver, et al. (2016) attempted to identify teacher practices that promote and limit the amount of MVPA students acquire during a PE lesson. The study found that no individual variable significantly related to the amount of MVPA acquired during the PE lessons. The study did however find that during motor content, teacher impact behaviors such as

demonstraiting or instructing and engaging in activity with students was common practice. Furthermore, the study found that the teacher "promoted physical activity" 6.2% of the time, a behavior variable that encourages physical activity, motor skills, or fitness. This study holds several implications, one being that when using SOFIT+, no observed behavior variable significantly impacted MVPA. The study also indicated through direct observation that teachers devoted 57.3% of lessons to inactive content (i.e., instruction and management). Teaching behaviors that were displayed during this study and the previously outlined studies indicate that PE teachers are not displaying teaching behaviors that are thought to maximize PA. This could be do to the lack of data that supports specific behaviors and their potential impact on PA.

Summary

The shift PE has undergone sense its established relationship with the public health sector has been substantial. No longer is PE seen as a supplemental part of the education curriculum, but an essential part of a child's well-being. Despite this shift, the benefits of PA being widely known and the guidelines for PA that have been established for youth, questions about best practices and how they relate to teacher effectiveness and QPE are still in need of inquiry. If, PE assumes that its primary objective is to provide students with the knowledge, skills and attitudes that are required to be PA for a lifetime and that this can be accomplished through increasing the opportunity to be PA in PE and other settings, then further analysis is required. The contribution that direct systematic observational methods have given to the field are exponential. However, little is known about teaching behaviors, specifically, the impact teaching behaviors that can contribute to the increase of student PA, as well as other positive student outcomes. Methods such

as SOFIT+ that attempt to comprehensively measure best-practices within PE must continue to be explored. Therefore, the aim of this study is to use a direct systematic observation method called the Observational Recording Record for Physical Educator Teaching Behaviors (ORRPETB) coupled with a direct student measure (pedometry) to analyze teaching behaviors that are displayed during PE, identify teaching behaviors that may contribute to positive student outcomes, and make recommendations to current and future physical educators on behaviors that should and should not be included in their teaching.

Description of Observational Variables

Full Description of ORRPETB Instrument Categories

The following are full descriptions of the instrument variables (Darst, Mancini, & Zakrajsek, 1983).

Climates: the following four categories are referred to as climates, or consequence assessments. They are an indirect assessment of teacher performance and are determined by what the students of the class are doing.

Instructional Time: refers to time in the class when, theoretically, the opportunity for the student to learn is present. Students can be receiving information either verbally or nonverbally. Also, during this time 51 percent of more of the students are not engaged in PA. Student behaviors that may be included within this variable include, listening to teacher lecture, watching a teacher or student model a skill, participating in classroom discussion or answering a teacher question.

Management Time: refers to the period of time in the class when, theoretically, the opportunity to learn is not present. During this time, 51 percent or more of the students are involved in activities that are only indirectly related to the class learning activity. There is no instruction, demonstration or practice. Student behaviors that may be included within this variable include, listening to roll call, getting out or putting away equipment, or transitioning from one activity to another.

Activity Time: refers to the period of time in class when 51 percent of more of the student are involved in actual physical movement in a manner that is consistent with the specific objectives of the lesson. Student behaviors that may be included within this

variable include, performing exercises or skills, or participating in team or individual sport.

Waiting Time: refers to the period of time in class when 51 percent or more of the students are prohibited from being categorized in other classroom climates. Student behaviors that may be included within the variable include, waiting for class to begin, waiting for instruction to resume when class has been disrupted or waiting for instructor to resume instruction from a non-class related activity.

Interactions: Behavior interaction refers to the times that the teacher initiates verbal or nonverbal communication towards a student or group of students or responds either verbally or nonverbally to student behavior. Interaction has been divided into five categories.

Individual: indicates the teacher is talking to or responding to either verbally or nonverbally to one student.

Group: indicates the teacher is talking to or responding to either verbally or nonverbally to more than one student, but not the entire class.

Class: indicates the teacher is talking to or responding to either verbally or nonverbally the entire group of students in the environment for which the teacher is responsible.

Male: indicates the teacher is talking to or responding to either verbally or nonverbally to all individuals in the class who are male.

Female: indicates the teacher is talking to or responding to either verbally or nonverbally to all individuals in the class who are female.

Teacher Behavior: teacher behaviors are divided into major categories; lecturing/orienting, asking questions, answering questions, listening, monitoring, managing, non-functional, skill feedback, modeling, social behavior, hustling, appropriate punishment, physical contact, teacher officiating, and teacher participation. Selected main categories are further divided into subcategories. For example, the main category of skill feedback, modeling, and social behavior have subcategories to give more specific description of the teacher behavior.

Lecturing or Orienting: indicates the teacher is giving facts or opinions about content or procedures and expresses his/her own ideas or the ideas of someone else. The teacher may be lecturing or orienting one or many students who may or may not be engaged in activity during the time.

Asking Questions: indicates the teacher is asking a student, group of students or class questions about content or procedures with the intent of said individual or group soliciting an answer. Students may or may not be engaged in activity during this time.

Answering Questions: indicates the teacher is responding to student(s) questions about content or procedures.

Listening: indicates the teacher is responding to student talk by listening to the student's questions or response.

Monitoring: indicates the teacher is observing the class without reacting verbally to the behaviors of the students, also the teacher is not being addressed by a student or group of students.

Nonfunctional: indicates the teacher is displaying behaviors that are not related to the ongoing activities of the class. The students may or may not be involved in activity during this time.

Managing: indicates times the teacher is using behaviors that are related to the class but are not contributing to the educational outcomes of the class. The students may or may not be involved in activity during this time. For example, the teacher may be repairing equipment that has broken during the course of class, sweeping water off the court that is being used during class, moving a mat to another area or retrieving balls or other objects that have been used in a drill or activity.

Skill Feedback: indicates the teacher is providing any information, either verbal or nonverbal, to the student in order to improve the next response. Feedback may be positive, negative, or corrective in nature, and the first two may be either general or specific.

Positive Skill Feedback - General: indicates the teacher is giving praise, either verbal or nonverbal, that follows a skill attempt or occurs during a skill attempt and is general in nature. It is very important that these comments are intended for skill attempts and not social behaviors. Examples: “Yes, Good!,” “At-a-boy,” A smile, thumbs up.

Positive Skill Feedback - Specific: indicates the teacher is giving praise that is verbal and occurs during or following a skill attempt and is specific in nature. Examples: “Yes, you kept your toes straight,” “Way to go, you kept your eye on the ball.”

Negative Skill Feedback – General: indicates the teacher is giving negative verbal or nonverbal, that follows a skill attempt or occurs during a skill attempt and is general in

nature. Examples: “You can do better.” “No, incorrect.” Shaking the head, throwing arms up.

Negative Skill Feedback - Specific: indicates the teacher is giving negative verbal feedback, occurs during or following a skill attempt, and is specific in nature. Examples: “Terrible. Your arms weren’t straight until you made contact.”

Corrective Skill Feedback: indicates the teacher is giving verbal information that is corrective in nature given during or following a skill attempt. Often corrective statements can become Negative Skill Feedback statements, and the tone or volume of the voice will be the indicator. Remember that Corrective Skill Feedback corrects the skill performance and does not scold that performance. Examples: “Keep your arms straight.”

Modeling: indicates the teacher is demonstrating a skill or activity used to show a student or students the correct or incorrect way to perform a skill or behavior. Verbal instruction may or may not accompany modeling, but the behavior should be recorded as modeling and not lecturing or orienting.

Teacher Modeling - Positive: indicates the teacher is demonstrating the correct way to perform a skill or behavior.

Teacher Modeling - Negative: indicates the teacher is demonstrating the incorrect way to perform a skill or behavior.

Student Modeling - Positive: indicates the teacher is having a student demonstrate the correct way to perform a skill or behavior.

Student Modeling - Negative: indicates the teacher is using a student to demonstrate the incorrect way to perform a skill or behavior.

Social Behavior: refers to the times the teacher reacts verbally or nonverbally to the social behavior of a student or students

Praise - General: refers to positive or supportive statements or gestures of a general nature made by the teacher during or following a behavioral episode.

Praise - Specific: refers to positive or supportive statements or gestures of a specific nature made by the teacher during or following a behavioral episode not related to skill attempts.

Nagging: refers to the times a teacher verbally or nonverbally scolds a student or students in a low intensity manner for an undesirable social behavior. Examples: “I told you to get in line.” “Shh...Didn’t I say to stop talking?”

Getting Nasty: refers to when a teacher verbally or nonverbally scolds a student or students in a high intensity manner for an undesirable behavior.

Hustling: refers to a teacher using verbal statements or gestures to activate or intensify previously directed behavior. The tone of voice and the enthusiasm level are extremely important to this category. These are motivating statements and caution should be taken not to mistake these statements and gestures for Negative Skill Feedback, General or Specific, statements.

Appropriate Punishment: refers to specific penalties imposed by the teacher on those students who break the class rules by exhibiting disruptive or deviant behaviors.

Physical Contact: refers to times the teacher physically touches a student during a skill attempt or explanation of a skill. If verbal statements accompany the physical contact, then it should be recorded as such.

Teacher Officiating: refers to when the teacher acts as an official during a game or activity and his/her behavior cannot be classified in the preceding categories.

Teacher Participation: refers to when the teacher is participating in a game or activity and is not involved in the teaching process

References

Andersen, R. E., Crespo, C. J., Bartlett, S. J., Cheskin, L. J., & Pratt, M. (1998). Relationship of physical activity and television watching with body weight and level of fatness among children. *JAMA, 279*(12), 938-942.

Bassett, D. R., Conger, S. A., Fitzhugh, E. C., & Coe, D. P. (2015). Trends in physical activity and sedentary behaviors of United States youth. *Journal of Physical Activity and Health, 12*(8), 1102-1111.

Beaman, R., & Wheldall, K. (2000). Teachers' use of approval and disapproval in the classroom. *Educational Psychology*, 431-446.

Beets, M. W., Morgan, C. F., Banda, J. A., Bornstein, D., Byun, W., Mitchell, J., . . . Erwin, H. (2011). Convergent validity of pedometer and accelerometer estimates of moderate-to-vigorous physical activity of youth. *Journal of Physical Activity and Health, 8*(2), 295-305.

Behets, D. (1997). Comparison of more and less effective teaching behaviors in secondary physical education. *Teaching and Teacher Education, 13*(2), 215-224.

Biddle, S. J., & Asare, M. (2011). Physical activity and mental health in children and adolescents: a review of reviews. *British Journal of Sports Medicine, 45*, 886-895.

Blankenship, B. (2013). Knowledge/skills and physical activity: Two different coins, or two sides of the same coin? *Journal of Physical Education, Recreation and Dance, 84*(6), 5.

Bowman, S. A., Gortmaker, S. L., Ebbeling, C. B., Pereira, M. A., & Ludwig, D. S. (2004). Effects of fast-food consumption on energy intake and diet quality among children in a national household survey. *Pediatrics, 113*(1), 112-118.

Bunker, D., & Thorpe, R. (1982). A model for the teaching of games in the secondary school. *Bulletin of Physical Education, 10*, 9-16.

Casey, A., Dyson, B., & Campbell, A. (2009). Action research in physical education: Focusing beyond myself through cooperative learning. *Educational Action Research, 17*, 407-423.

Centeio, E. E., Castelli, D., Carson, R. L., Beighle, A., & Glowacki, E. (2014). Comprehensive school physical activity programs: current practice & promise. *Research Quarterly for Excercise and Sport, 85*(S1), A2-A3.

Center for Disease Control and Prevention. (1997). *Guidelines for school and community programs to promote lifelong physical activity among young people.* MMWR Morb Mortal Wkly Rep.

Center for Disease Control and Prevention. (2013). Comprehensive school physical activity programs: a guide for schools. Atlanta, GA.

Centers for Disease Control and Prevention. (2011). *School health guidelines to promote healthy eating and physical activity.* Washington DC: MMWR.

Centers for Disease Control and Prevention. (2017, June 28). *Youth Physical Activity Guidelines Toolkit*. Retrieved from Health Schools: https://www.cdc.gov/healthyschools/physicalactivity/guidelines.htm

Chatoupis, C., & Vagenas, G. (2018). Effectiveness of the practice style and reciprocal style of teaching: A meta-analysis. *Physical Educator, 75*(2), 175-194.

Cheffers, J. (1972). The validation of an instruciton design to expand Flanders system of interaction analysis to describe nonverbal interaction, different varieties of teacher behavior and pupil responses. *Unpubished doctoral dissertation, Temple University*.

Corbin, C. B., & Pangrazi, R. P. (1998). *Physical activity for children: A statement of guidelines.* Reston, VA: NASPE Publications.

Cornelius-White, J. (2007). Learner-centered teacher - student relationships are effective: A meta-analysis. *Review of Educational Research, 77*, 113-143.

Darst, P., Mancini, V., & Zakrajsek, O. (1983). *Systematic observation instrumentation for physical education.* West Point, NY: Leisure Press.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior.* New York: Plenum.

Dehghan, M., Noori, A. D., & Merchant, A. T. (2005, September 2). *Childhood obesity, prevelence and prevention.* Retrieved from nutritionj.biomedcentral.com: www.nutritionj.com/content/4/1/24

Dobbins, M., Husson, H., DeCorby, K., & LaRocca, R. L. (2013). *School-based physical activity programs for promoting physical activity and fitness in children and adolescents aged 6 to 18.* John Wiles & Sons, Ltd.

Eggen, P., & Kauchak, D. (2001). *Strategies for teachers: teaching content and thinking skills.* Needham Heights, MA: Allyn and Bacon.

Fairclough, S. J., & Stratton, G. (2006). A review of physical activity levels during elementary school physical education. *Journal of Teaching in Physical Education, 25*, 239-257.

Flanders, N. (1970). *Analyzing teaching behavior.* Reading, Mass.: Addison-Wesley Publishing Company.

Flanders, N. A., & Simon, A. (1969). Teacher effectiveness. *Journal of Classroom Interaction, 5*(1), 18-37.

Fryar, C. D., Carroll, M. D., & Ogden, C. L. (2016). *Prevalence of overweight and obesity among children and adolescents aged 2-19 years: United States, 1963-1965 through 2013-1014.* Division of Health and Nutrition Examination Surveys.

Gibson, S. (2000). Associations between energy density and macronutrient composition in the diets of pre-school children: sugars vs starch. *International Journal of Obesity, 24*, 633-638.

Gillies, R. (2008). Teachers' and students' verbal behaviours during cooperative learning: Issues of implementation. *Teaching and Teacher Education*, 238-257.

Goodyear, V., & Dudley, D. (2015). "I'm a facilitator of learning!" Understanding what teachers and students do within student-centered physical education models. *Quest, 67*(3), 274-289.

Goudas, M., Biddle, S., Fox, K., & Underwood, M. (1995). It ain't what you do, its the way that you do it! Teaching styles affects chldren's motivation in track and field lessons. *The Sport Psychologist, 9*, 254-264.

Griffin, L. L., & Butler, J. (2005). *Teaching games for understanding: Theory, research, and practice.* Champaign, IL: Human Kinetics.

Gurvitch, R., & Metzler, M. (2013). Keeping the purpose in mind: The implementation of instructional models in physical education settings. *Strategies*, 32-35.

Hannon, J. C., & Ratliffe, T. (2007). Opportunities to participate and teacher interactions in coed versus single-gender physical education settings. *Physical Educator, 64*(1), 11-20.

Hannon, J. C., Destani, F., McGladrey, B., Williams, S. M., & Hill, G. (2013). Physical activity levels, lesson context, and teacher behaviours in elementary physical eductiaon classes taught by paraeducators. *International Journal of Elementary Education, 2*(3), 23-26.

Hastie, P. A. (1994). Selected teacher behaviors and studenet ALT-PE in secondary school physical education. *Journal of Teaching in Physical Education, 13*(3), 242-259.

Hill, J. O., & Peters, J. C. (1998). Environmental contributions to the obesity epidemic. *Science, 280*(5368), 1371-1374.

Jago, R., McMurray, R. G., Bassin, S., Pyle, L., Ruecker, S., & Jakicic, J. M. (2009). Modifying middle school physical educaiton: Piloting strategies to increase physical activity. *Journal of Pediatric Exercise Science, 21*(2), 171-185.

Janssen, I., & Leblanc, A. G. (2010). Systematic review of the health benefits of physical activity and fitness in school-aged children and youth. *International Journal of Behavioral Nutrition and Physical Activity, 7*(40).

Kann, L., Collins, J. L., Pateman, B. C., & Samll, M. L. (1995). The school health policies and programs study. *The Journal of School Health, 65*(8), 291.

Katzmarzyk, P. T., Denstel, K. D., Beals, K., Bolling, C., Wright, C., Crouter, S. E., . . . Sisson, S. B. (2016). Results from the United States of America's 2016 report card on physical activity for children and youth. *Journal of Physical Activity and Health* , S303-S313.

Kilpatrick, M., Hebert, E., & Jacobsen, D. (2002). Physical activity motivation: A practitioner's guide to self-determination theory. *Journal of Physical Education, Recreation & Dance, 73*(4), 36-41.

Koka, A., & Hagger, M. S. (2010). Perceived teaching behaviors and self-determnd motivation in physical education: A test of self-determination theory. *Research Quarterly for Exercise and Sport, 81*(1), 74-86.

Krebs, N. F., Himes, J. H., Jacobson, D., Nicklas , T. A., Guilday, P., & Styne, D. (2007). Assessment of child and adolescent overweight and obesity. *Journal of Pediatrics , 120*(4), 5193-5228.

Lacy, A., & Darst, P. (1984). Evolution of a systematic observation instrument: The ASU Observation Instrument. *Journal of Teaching in Physical Education, 3*(3), 59-66.

LaFee, S. (2008). Lets get physical! P.E. struggles to make the grade. *Education Digest, 73*(6), 49-52.

LaMaster, K. J., & Lacy, A. C. (1993). Relationship of teacher behaviors to ALT-PE in junior high school physical education. *The Journal of Classroom Interaction, 28*(1), 21-25.

Lee, A. (2003). How the field evolved. In S. E. Silverman, *Student Learning in Physical Educaiton: Applying Research to Enhance Instruction* (pp. 9-25). Champaign, IL: Human Kinetics.

Lee, A. M., Keh, N. C., & Magill, R. A. (1993). Instructional effects of teacher feedback in physical education. *Journal of Teaching in Physical Education, 12*(3), 228-243.

Locke, L. (1977). Research in physical education: A new hope for a dismal science. *Quest, 28*(1), 2-16.

Lombardo, B., & Cheffers, J. (1983). Variability in teaching behavior and interaction in the gym. *Journal of Teaching in Physical Education, 2*, 31-38.

Lonsdale, C., Rosenkranz, R. R., Peralta, L. R., Bennie, A., Fahey, P., & Lubans, D. R. (2013). A systematic review and meta-analysis of interventions designed to increase moderate-to-vigorous physical activity in school physical education lessons. *Preventitive Medicine, 56*, 152-161.

Lorson, K. (2003, June 10). *The influence of three instructional strategies on the performance of the overarm throw.* Retrieved from Available from: ProQuest Dissertations & Thesis Global: search-proquest-com.ezproxy.uky.edu

Lubans, D. R., Morgan, P. J., Cliff, D. P., Barnett, L. M., & Okely, A. D. (2010). Fundamental movement skills in children and adolescents: review of associated health benefits. *Sports Medicine, 40*, 1019-1035.

Ludwig, D. S., Peterson, K. E., & Gortmaker, S. L. (2001). Relation between consumption of sugar-sweetned drinks and childhood obeisyt : A prospective, observational analysis. *The Lancet, 357*, 505-508.

Lund, J. (2013). Activity in physical education: Process or product? *Journal of Physical Education, Recreation and Dance, 84*(7), 16-17.

Lustig, R. H. (2001). The neuroendocrinology of childhood obesity. *Pediatric Clinics of North America, 48*(4), 909-930.

Marx, R. W., & Peterson, P. L. (1981). The nature of teacher decision making. *Flexibility in teaching: An excursion into the nature of teaching and training*.

McKenzie, T. L., & Lounsberry, M. A. (2014). The pill not taken: Revisiting physical education teacher effectiveness in a public health context. *Research Quarterly for Exercise and Sport, 85*(3), 287-92.

McKenzie, T. L., & Lounsbery, M. (2013). Physical education teacher effectiveness in a public health context. *Research Quarterly for Exercise and Sport, 84*(4), 419-430.

McKenzie, T. L., Marshall, S. J., Sallis, J. F., & Conway, T. L. (2000). Studentt activity levels, lesson context, and teacher behavior during middle school physical education. *Research Quarterly for Exercise and Sport, 71*(3), 249-59.

McKenzie, T. L., Sallis, J. F., Prochaska, J. J., Conway, T. L., Marshall, S. J., & Rosengard, P. (2004). Evaluation of a two-year middle-school physical educaiton intervention:M-SPAN. *Jounal of Medical Science and Sports Exercise*, 1382-1388.

McKenzie, T., Sallis, J., & Nader, P. (1992). SOFIT: System for observing fitness instruction time. *Journal of Teaching in Physical Education, 11*(2), 195-205.

McKenzie, T., Stone, E. J., Feldman, H. A., Epping, J. N., Yang, M., Strikmiller, P. K., & Parcel, G. S. (2001). Effects of the CATCH physical eduation intervention: Teacher type and lesson location. *American Journal of Preventitive Medicine, 21*(2), 101-109.

Metzler, M. (2017). *Instructional models in physical education.* Routledge.

Metzler, M. W. (2014). Teacher effectiveness research in physical education: The future isn't what it used to be. *Research Quarterly for Exercise and Sport, 85*, 14-19.

Miller, B. (1985). Dissertation: A descriptive analysis of academic learning time and teacher behaviors in regular, mainstreamed, and adapted physical education classes. ProQuest Dissertations and Theses. Retrieved from ProQuest Dissertations and Thesis.

Morgan, C. F., Beighle, A., & Pangrazi, R. P. (2007). What are the contributory and compensatory relationships between physical education and physical activity in children? *Research Quarterly for Exercise and Sport, 78*(5), 407-412.

Morgan, K., Sproule, J., & Kingston, K. (2005). Effects of different teaching styles on the teacher behaviours that influence motivational climate and pupils' motivation in physical education. *European Physical Educaiton Review, 11*(3), 257-285.

Mosston, M. (1966). *Teaching Physical Education.* Columbus, OH: Charles E. Merrill Publishing Co.

Mosston, M., & Ashworth, S. (2002). *Teaching Physical Education; 5th edn.* San Francisco: Benjamin Cummins.

National Institute for Child Health and Human Development [NICHD]. (2003). Study of early child care and youth development network. *Archives of Pediatrics & Adolescent Medicine, 157*, 185-190.

Ogden, C. L., Carroll, M. D., Lawman, H. G., Fryar, C. D., Kruszon-Moran, D., Kit, B. K., & Flegal, K. M. (2016). Trends in obesity prevalence among children and adolescents in the United States, 1988-1994 through 2013-2014. *JAMA, 315*(21), 2292-2299.

Pangrazi, R. P., & Beighle, A. (2015). *Dynamic physical education for elementary school children (18th edition).* Pearson.

Pangrazi, R. P., Beighle, A., & Sidman, C. L. (2007). *Pedometer power: Using pedometers in school and community.* Human Kinetics.

Pate, R. R., Davis, M. G., Robinson, T. N., Stone, E. J., McKenzie, T. L., & Young, J. C. (2006, September 11). Promoting physical activity in children and youth. *Circulation: AHA Scientific Statement, 114*, pp. 1214-1224.

Peterson, P. L., Marx, R. W., & Clark, C. M. (1978). Teacher planning, teacher behavior, and student achievement. *American Educational Research Journal, 15*(3), 417-432.

Rasberry, C. N., Lee, S. M., Robin, L., Laris, B. A., Russell, L. A., Coyle, K. K., & Nihiser, A. J. (2011). The association between school-based physical activity, including physical education, and academic performance: a systematic review of the literature. *Priventive Medicine*, S10-S20.

Rasmussen, J. F., Scrabis-Fletcher, K., & Silverman, S. (2014). Relationships among tasks, time, and student practice in elementary physical education. *The Physical Educator, 71*, 114-131.

Rink, J. E. (2013). Measuring teacher effectiveness in physical education. *Research Quarterly for Exercise and Sport, 84*(4), 407-418.

Rink, J. E. (2013). Measuring teacher effectiveness in physical education. *Research Quarterly for Exercise and Sport, 84*(4), 409-417.

Sadowski, J., Mastalerz, A., Niznikowski, T., Wisniowski, W., Biegajlo, M., & Kulik, M. (2011). The effects of different types of verbal feedback on learning a complex movement task. *Polish Journal of Sport and Tourism, 18*(4), 308-310.

Sallis , J., & McKenzie, T. L. (1991). Physical education's role in public health. *Research Quarterly for Exercise and Sport, 62*, 124-137.

Sallis, J. F., McKenzie, T. L., Alcaraz, J. E., Kolody, B., Faucette, N., & Hovell, M. F. (1997). The effects of a 2-year physical edcuation program (SPARK) on physical activity and fitness in elementary school students. *Journal of Public Health, 97*(8), 1328-1334.

Sallis, J. F., McKenzie, T. L., Beets, M. W., Beighle, A., Erwin, H., & Lee, S. (2012). Physical education's role in public health: Steps forward and backward over 20 years and HOPE for the future. *Research Quarterly for Exercise and Sport, 83*(2), 125-135.

Sallis, J. F., Prochaska, J. J., & Taylor, W. C. (2000). A review of correlates of physical activity of children and adolescents. *Medicine & Science in Sports & Exercise, 32*(5), 963-975.

Sallis, J., & McKenzie, T. L. (1991). Physical education's role in public health. *Research Quarterly for Exercise and Sport*(62), 124-137.

Sallis, J., McKenzie, T. L., Beets, M. C., Beighle, A., Erwin, H., & Lee, S. (2012). Physical education's role in public health: Steps forward and backwad over 20 years and HOPE for the future. *Research Quaterly for Exercise and Sport, 83*(2), 125-135.

Scruggs, P. W., Beveridge, S. K., Eisenman, P. A., Watson, D. L., Schultz, B. B., & Ransdell, L. B. (2003). Quantifying physical activity via pedometry in elementary physical education. *Med. Sci. Sports Exerc, 35*(6), 1065-1071.

SHAPE America - Society of Health and Physical Education. (2014). *National PE Standards*. Retrieved from shapeamerica.org: shapeamerica.org/standards/pe

SHAPE America. (2015). *The essential components of physical education.* Retrieved from SHAPE America: Guidance Document: https://www.shapeamerica.org//upload/TheEssentialComponentsOfPhysicalEducation.pdf

Siedentop, D., & Tannehill, D. (2000). *Developing teaching skills in physical education.* Mountain View, CA: Wayfield.

Silverman, S., Tyson, L., & Krampitz, J. (1992). Teacher feedback and achievement in physical educaiton: Interaction with student practice. *Teaching and Teacher Education, 8*(4), 333-344.

Singh, A. S., Mulder, C., Twisk, J. W., van Mechelen, W., & Chinapaw, M. J. (2008). Tracking of childhood overweight into adulthood: A systematic review of the literature. *Obes Rev. , 9*(5), 474-488.

Society of Health and Physical Educators. (2015). *Essential Components of Physical Education*. Retrieved July 2017, from shapeamerica.org: http://www.shapeamerica.org/upload/TheEssentialComponentsOfPhysicalEducation.pdf

Stewart, M. (1979). Observational recording record of physical educator's teaching behavior (ORRPETB). *Dissertation*.

Strauss, R. (2000). Childhood obesity and self-esteem. *Pediatrics, 105*(1), 1-5.

Stronge, J. H. (2018). *Qualities of effective teachers.* Alexandria, VA: ASCD.

Trost, S. G. (2001). Objective measurement of physical activity in youth: Current issues, future directions. *Exercise and Sport Sciences Reviews, 29*(1), 32-36.

Trost, S. G., Kerr, D. S., Ward, D. S., & Pate, R. R. (2001). Physical activity and determinants of physical activity in obese and non-obese children. *International Journal of Obesity, 25*, 822-829.

U.S. Department of Health and Human Services. (2009). *2008 physical activity guidelines.* Washington, DC: US-DHHS.

U.S. Department of Health and Human Services: Office of Disease Prevention and Health Promotion. (2014, June). *Physical Activity*. Retrieved from healthypeople.gov: https://www.healthypeople.gov/2020/topics-objectives/topic/physical-activity

U.S. Department of Health and Human Services: Physical Activity Guidelines Advisory Committee. (2008). *Physical Activity Guidelines for Americans.* Washington DC: U.S. Department of Health and Human Services.

U.S. Department of Health and Human Services: Physical Activity Guidelines Advisory Committee. (2008). *Physical activity guidelines for americas.* Washington DC: U.S. Department of Health and Human Services.

US Department of Health and Human Services. (1996). *Physical activity and health: a report of the Surgeon General* . Atlanta, GA: US Department of Health and Human Services, Public Health Service, CDC, National Center for Chronic Disease Prevention and Health Promotion.

US Department of Health and Human Services. (2000). *Healthy people 2010: Understanding and improving health.* Washington DC: USDHHS.

Van der Mars, H. (1989). Systematic observation: An introduction. *Analyzing Physical Education and Sport Instruction, 2*, 2-17.

Ward, P. (2013). The role of content knowledge in conceptions of teaching effectiveness in physical education. *Research Quarterly for Exercise and Sport, 84*(4), 431-40.

Weaver, R. G., Webster, C. A., Erwin, H., Beighle, A., Beets, M. W., Choukroun, H., & Kaysing, N. (2016). Modifying the system for observing fitness instruction time to measure teacher practices related to physical activity promotion: SOFIT+. *Measurement in Physical Education & Exercise Science, 20*(2), 121-130.

Weidong, L. (2015). Strategies for creating a caring learning climate in physical education. *Journal of Physical Education, Recreation & Dance, 86*(4), 34-41.

Whitaker, R. C., Wright, J. A., Pepe, M. S., Seidel, K. D., & Dietz, W. H. (1997). Predicting obesity in young adulthood from childhood and parental obesity. *New England Journal of Medicine, 337*(13), 869-873.

Wright, S., & Walkuski, J. (1995). The use of systematic observation in physical education. *Teaching and Learning, 16*(1), 65-71.

Wright, S., & Walkuski, J. (1995). The use of systematic observation in physical education. *Teaching and Learning, 16*(1), 65-71.

Yu, J. H., & Kim, J. K. (2010). Patterns of interactions and behaviors: Physical education in Korean elementary, middle, and high schools. *Journal of Research, 5*(1), 26-32.

Zeigler, E. (1994). Physical educations 13 principal principles. *Jouranl of Physical Education, Recreation and Dance, 65*, 4-5.

Seth T. Eckler
Vita

Place of Birth:	Lexington, Kentucky
Education:	University of Kentucky Lexington, Kentucky Bachelors of Arts in Physical and Health Education August 2008
	University of Kentucky Lexington, Kentucky Master's of Science in Education August 2010
Professional Positions:	Middle School Physical Educator R.A. Jones Middle Florence, Kentucky 2013 – 2015
	Elementary School Physical Educator Garth Elementary Georgetown, Kentucky 2010-2012
	Part Time Instructor University of Kentucky Lexington, Kentucky 2008- 2010
Honors:	John Edwin Partington and Gwendolyn Gray Partington Scholarship Award Winner

Publications:

Erwin, H., Beighle, A., Eckler, S., (2017). PETE Preparation for CSPAP at the University of Kentucky. *Journal of Physical Education, Recreation and Dance*. *88* (1), 36-41.

Eckler, S. (2016). Increasing Youth Physical Activity with Activity Calendars. *Journal of Physical Education, Recreation and Dance. 87* (5), 47-49.